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Last Served Best Helping

THE acceptance by the National Union of Railwaymen of a 3 per cent wage increase for 120,000 railway workshops staff will cost the British Transport Commission about £1,500,000 a year. In addition, the workshops staff has been promised a further review of wages "in the light of future developments." Fearing possible redundancy, the unions did not re-affirm their willingness to co-operate in the railway modernisation programme, but the Commission "confidently expects that this co-operation will be fully given." The increase was accepted in the face of strong opposition from the Confederation of Shipbuilding & Engineering Unions which, although its membership in the workshops staff constitutes a minority, exercises a majority vote on the trade union side of the negotiating body because of its preponderance of craftsmen. The Confederation feared that acceptance of the 3 per cent offer would prejudice its claim for a 6 per cent increase for 2,750,000 engineering workers. Mr. S. F. Greene, General Secretary of the N.U.R., whose influence has been largely instrumental in persuading the members of his union to accept the 3 per cent offer, has also expressed doubt on the matter. He fears that the N.U.R. is setting a pattern for others to its own disadvantage. Mr. Greene is probably voicing a growing appreciation of the fact that the first to receive a wage increase does not necessarily come off best in the long run. On many occasions recently the railwaymen have been in the vanguard for wage awards. Increasingly often, other claims have been settled on the new railway level or at one slightly above. It might be that the leaders of the railway unions would more profitably hold their hands on future occasions rather than effect a settlement which, by acting as a yardstick for other unions, places N.U.R. members in an unfavourable position within a relatively short period of time. The whole question of the railway wage structure is to be reviewed in the near future. This review will be important because it will apply not so much to the general level of wages as to the particular level of wages within the general pattern.

Sir J. Landale Train

SIR J. LANDALE TRAIN, who is to retire as a full-time Member of the British Transport Commission on September 30, is the only serving member of the Commission who was a railway officer when the railways were nationalised, became a member of the Railway Executive on its inception, and on its dissolution went on the Commission. He has therefore held high executive and administrative office throughout the period of nationalised transport. Distinguished in appearance as well as in ability, he is an example of the Scot who came South to make his career. In 34 years, despite five of these being spent in the Army during the 1914-18 war, he rose from an apprentice on the Great Northern Railway to Chief Engineer of the L.N.E.R. He proved to be an apt choice as member responsible for civil engineering matters, first on the Railway Executive and later on the British Transport Commission. His long engineering experience, and his academic qualifications, have made him an excellent committee chairman. His ability and long service to railways were recognised last year by the award of a Knighthood in the New Year Honours List.

Mr. John Ratter

MR. JOHN RATTER, who takes up his appointment on September 30 as a full-time Member of the British Transport Commission, has won prominence as a permanent way engineer in both civilian and military fields. During the war, as Deputy-Director Transportation, Royal Engineers, Allied Forces Headquarters, he was responsible for all Allied railway construction in Italy. His services were recognised not only by the award of the O.B.E. and later the C.B.E., but also of the American Legion of Merit. In 1948, Mr. Ratter's paper "Recovery, Repair and Distribution of Permanent Way Material," won him the Crampton Prize of the Institution of Civil Engineers. Mr. Ratter, whose biography appears elsewhere in this issue, has wide experience not only as a Military Engineer but also through many years service on British Railways and the London Transport. He has been giving sterling service to the Commission as Technical Adviser, and his quiet competence has won him the confidence of a great number of friends both within and outside British Railways, all of whom have welcomed his appointment to the Commission.

Uneasy Peace

DELEGATES representing the London busmen showed wisdom on July 17 in accepting London Transport's wage offer of 5s. a week for the 12,000 country crews and maintenance staff. It must have been obvious that no improvement on that figure would be gained at present: appeal to outside authorities had proved unrewarding, and strike action so unprofitable as to be out of the question. The offer was accepted with bad grace and

the view expressed that future relations between Executive and union would be strained: such an attitude would seem to be the natural result of disappointment, understandable if not justified. All the trouble is by no means over. Mr. H. R. Nicholas, Assistant General Secretary of the Transport & General Workers' Union, told delegates that the Executive had agreed to pay regard to wage movements in comparable grades outside—for example, the railway wage review, due to begin next month. It is a foregone conclusion, therefore, that even greater pressure will be exerted by the busmen if the general transport wage spiral takes another upward turn. Nevertheless, the busmen should not try to press home an advantage which might prove to be non-existent. In view of the cuts and economies necessary in London Transport's present diminishing organisation, it is difficult to see how this latest undertaking to the unions is to be honoured in due course unless changes made are very radical indeed. It may well be that future conditions will be such that the busmen's disinclination to support service reductions will be matched by the Executive's inability to alleviate distress caused by such cuts.

Loan for Sudan Railway Development

DETAILS are not yet available of the plans for railway development which the Government of the Sudan intends to execute with the help of the World Bank loan of $39 million, approved earlier this week. Some U.S.A. banks are reported to be participating in the loan, without the World Bank guarantee, for a total amount of $1,750,000, which represents the first three maturities which fall due between December 1, 1961, and December 1, 1962. Of the extensions projected of the Sudan Railways, the biggest is the 800-mile link with the Nigerian Railway, also on the 3-ft. 6-in. gauge, through French-administered Chad Territory. This major project was described in our issue of October 11, 1957. It is not known how far negotiations have progressed with the French authorities, or indeed whether the Sudan Government intends to make a start on the line, now that funds are available. There are a good many other spheres in which money could usefully be spent to develop the Sudan Railways, which include extensive river steamer services.

Reduced Expenditure in East Africa

SPECIAL meetings of the East African Transport Advisory Council and the Railways and Harbours Committees were held earlier this month primarily to consider capital expenditure planned under the £8½-million Loan Act of 1957. This, it was felt, should be reviewed in the light of changing circumstances, more particularly the less favourable traffic trends. The limited availability of capital funds and the present surplus capacity of East African Railways & Harbours—referred to in an editorial article last week—were considered; accordingly it was decided that capital funds should be reserved for works which would produce economies in operation and would safeguard the net revenue position in future years; for those needed to replace and improve existing equipment or facilities to provide for the future; or for social services such as housing. The Council agreed that £2 million be spent on major projects for new lines or re-alignments; £1·55 million on diesel locomotives and maintenance facilities and other Mechanical Department needs; £1·5 million on the deep-water berths at Kipevu, Mombasa, and lesser amounts on various items, including £540,000 on re-laying and re-sleepering and bridge strengthening, to a total of £7 million.

Survey of Cut-Off Line, and Re-Laying

THIS restricted expenditure on the railway system in three African territories, Kenya, Uganda, and Tanganyika, still comparatively undeveloped, is very cautious; it leaves about £1·3 million uncommitted from the total authorised in the 1957 Act. It was agreed that £400,000 should be kept available for miscellaneous works not yet considered in detail and £900,000 for projects not yet considered or for railway or harbours works after 1960. The principal railway project accepted in principle is the Bukonte-Jinja cut-off; the cost of construction is at present estimated at just over £1 million and £9,000 is to be spent immediately on further survey work. Other railway expenditure approved is £418,000 on re-laying of the existing 50-lb. track on the 58-mile Jinja-Kampala section with second-hand 80-lb. track, and £240,200 on housing, largely for junior African staff. Members of the Transport Advisory Council also inspected two mock-up versions of the first class "roomette" single-berth compartment coaches which it is proposed to introduce on certain services. Most travellers in the tropics, even with air conditioning, desire ample space. It will be interesting to see how the problem of the limitations imposed by the metre gauge will be solved.

Single Management for Bengal-Bihar Electrification

THE main-line electrification project for the Eastern and South Eastern Railways of India provides for conversion of 1,350 route-miles at an estimated cost of Rs.84 crores (£63 million). Electrification between the Calcutta Docks and Moghalsarai on the Eastern Railway and between Asansol and Rourkela, including the Barajamda branch and the Tatanagar-Kharagpur section on the South Eastern, have been planned for completion by the end of 1960. The postponement, however, as an economy measure, of electrification in the Sealdah Division of the Eastern Railway, referred to last week, presumably will delay plans as regards Calcutta Docks. Some sections are to be completed before the end of next year. With the quickening tempo of the work, the electrification project oganisation must shoulder heavier responsibilities. Besides maintaining close liaison with the other railway departments, and with the many suppliers of motive power, rolling stock, and electrical equipment, and with several departments of the Central and State Governments, it must also design equipment, procure materials, and execute work in the field. The Railway Board has felt that the situation now demands direction of the project by one officer. It has therefore appointed Mr. H. D. Awasty, formerly Director, Civil Engineering, Railway Board, to take charge of the work as General Manager & Chief Engineer, Railway Electrification, with headquarters in Calcutta.

Improved Method of Re-Laying in Western Region

ON single lines and double lines where two-line occupations for a track-laying machine are difficult, British Transport, Western Region, is using a new method, in which the loading up of the old rails is carried out before re-laying. The displaced rails are loaded up by the end-on method in pairs, not by pulling on with an engine, but with a diesel winch mounted on a flat wagon coupled up beyond the bogie rail wagon. The old rails are barred out of chairs into the four-foot, where they are attached with shackles and short chains to the end of a cable run out from the winch over the intervening wagon; the winch then hauls them on to the latter. The old sleepers are moved to the cess ready for subsequent removal. Although there is longer line occupation in advance of the scarifiers and relaying gang getting to work, this disadvantage is greatly outweighed by savings in manpower and engine-power costs—compared with loading the rails on a later Sunday—and the necessity for one less occupation. The old rails are more quickly available for re-use, and disturbance of the ballast shoulder unavoidable when rails are loaded from the cess after re-laying, is obviated. One reason for using the winch in preference to pulling old rails on to the wagon with an engine is the ability to pull rails over two vehicles, which reduces the frequency with which loaded wagons must go to sidings for replacement.

River Training

THE vagaries of rivers in many countries, more especially in the tropics, add greatly to the cost of building and maintaining bridges and of keeping lines open during floods caused by heavy rainfall or snow water from mountain ranges; and to many managements the science of river training is of the utmost importance. The railways of India and Pakistan have been pioneers in this field, and works published by their civil engineers are still regarded as authoritative. In the Republic of India the Railway Board has ordered a study of the subject to be made, for the benefit not only of the railways, but also of other public authorities concerned. The Board feels that examination on a national scale is now necessary, because of the advances made in techniques in the past few years. The behaviour of rivers is a greater problem than ever in India, where more than one recently-built line, such as the Assam Link, runs through a sub-montane region, crossing many swift-flowing streams. Construction of the bridges over the Ganges at Mokameh and over the Brahmaputra at Pandu also makes the subject of immediate significance. It is fitting, therefore, that the study should be entrusted to Mr. H. K. L. Sethi, General Manager & Chief Engineer of the Ganga (Ganges) Bridge project at Mokameh. The results of his work will be noted with interest in many countries besides India.

Derby-Built Type "2" Diesels

THE first line-service diesel-electric locomotive to be completed by British Railways' workshops under the original modernisation programme has been completed and was available for inspection yesterday (Thursday) at Marylebone Station. With a Type "2" power classification, it has a 1,160-h.p. Sulzer diesel engine and B.T.H. power equipment, and is one of 30 being built at Derby for service in the Eastern, London Midland, and Southern Regions. The locomotive weighs 75 tons in full working order, all of which is available for traction by reason of the Bo-Bo arrangement. The layout of the equipment and methods of construction followed are generally conventional for a British diesel locomotive with electric transmission; the all-up weight, however, is lower than some comparative diesel-electric designs mainly because of the use of aluminium alloy, principally for cab, floors, main roof and so on, and polyester resin for cab roof sections. Coming so soon after the Swindon-built 2,200-h.p. diesel-hydraulic locomotive, described in last week's issue, however, the gilt is taken off the gingerbread when it is remembered that this latter design with a mere 3½ tons extra weight produces practically twice the power.

Swindon-Built Diesel Performance

DETAILS are given on page 111 of a run from Plymouth to Paddington by Type "4" diesel-hydraulic locomotive D.800 *Sir Brian Robertson,* which was placed in service in the Western Region last week. The run took place on July 16 with the 4.10 p.m. from Plymouth North Road. With a 15-min. late start from Taunton, time was made up and a further 10 min. gained on the booked 153-min. schedule for the 143 miles, which were completed in 128 min.; the average speed was 67 m.p.h., with a tare load of 448 tons. What will interest most observers, however, is the performance of the locomotive on heavy gradients: two encountered on this run include Hemerdon bank, just over two miles of 1 in 41-42, and the 20½ miles of rising gradients from Exeter up to Whiteball with the last two miles at 1 in 115. Although it is difficult to find exactly similar conditions, some comparison may be made with two special runs in 1956 when the Western Region arranged for "King" 4-6-0 and "Duchess" 4-6-2 classes to haul trains of some 390 tons over this route. In these instances, start to pass times from Plymouth to the top of Hemerdon bank (6·7 miles) were 12¼ (estimated net) and 12¾ min. respectively, both with the assistance of a pilot; D.800 with a train of 312 tons tare took 13 min. unassisted. From Exeter to Whitehall summit unassisted steam-hauled pass-to-pass times were 20¾ and 21½ min. respectively, in both cases passing Exeter at some speed. From a standing start the diesel, the tare load now increased to 448 tons, ascended in a start-to-pass time of 22 min.; despite train loads in favour of steam the performance shows the diesel's superiority. The vastly different locomotive weights required by steam and diesel to perform roughly equivalent tasks, must be borne in mind. D.800 weighs 78½ tons, whereas the "King" and "Duchess" total 135¾ and 161½ tons respectively; it is not hard to see why the Western Region should have favoured this design of diesel-hydraulic motive power.

A Foreshortened Debate

IT is a pity that the annual debate in the House of Commons on the Report and Accounts of the British Transport Commission had to be cut to half-a-day last week because of the Middle East crisis. As a consequence, the serious situation in which the Commission now finds itself could not be adequately discussed, nor could it be expected that the attention of Members, nor that of the Press, would be concentrated upon it. In the event, the Minister of Transport & Civil Aviation, Mr. Harold Watkinson, did not find time to consider the serious financial position of the Commission nor to reveal what were the Government's plans for meeting it. In fact, his shortened speech disclosed an optimism which does not seem justified by last year's results. In displaying the expectation that the estimates of the White Paper that the Commission would break even by 1961-62 would be fulfilled, Mr. Watkinson quoted the Chairman of the Commission, Sir Brian Robertson, as advising him that "he and his colleagues still believe themselves on reasonable ground in keeping within the terms of the White Paper and thus to break even by 1961-62."

The fact remains, however, that current traffics are far from encouraging, and that the Commission faces a wages bill increased by some millions and other higher costs and, according to the Minister, believes that raising charges would not, at present, materially increase revenue —in which view the management is certainly right as regards most railway charges. It has been decided, however, to apply for permission from the Transport Tribunal to obtain power to increase fares and charges; but the Minister implied that no increase would take place before next year. Since last year's deficit, after central charges, was £63.5 million it is hard to see how the break-even estimate is to be fulfilled within the next four years. But whether it is or not, the financial position of the Commission will then be most serious, and how it is to be tackled was not revealed during the debate. This was the main burden of the Opposition charge against the Government: Mr. Ernest Davies, Labour M.P. for Enfield East, suggested that the accumulated liabilities and indebtedness, as a result of deferment of the deficits and interest thereon, would reach "astronomical figures" by 1962. That is putting it strongly—especially in relation to the annual turnover of £700 million, but certainly there is going to be a millstone of deferred indebtedness around the Commission's neck. Already it amounts to the £202 million transferred to the Special Account. However the estimates are looked at, if the permitted deficit borrowing of £250 million is drawn upon to the full, as it will have to be, it might reach £500 million by 1962 unless the situation radically improves. It is difficult to consider it other than unrealistic to expect even a smaller sum to be repaid out of future earnings.

Meanwhile the Government has preferred also to leave over to the future the problem of financing the deficits should they exceed the permissible total of £250 million. As the Opposition pointed out £118 million has been drawn upon in the first two years and five remain, so it understandably expressed doubts as to whether the residue of £132 million would be enough to meet the deficits likely to be incurred before 1962, when deficit financing ends. The Government view, as expressed by Mr. Watkinson, is reasonable. It considers that by

limiting the amount that can be loaned to meet the deficits a financial discipline is exercised over the Commission which, it is claimed, prefers it that way. That is a justifiable view only if the limitation is realistic, and discipline strictly enforced.

On the other hand, the railways are certainly doing a great deal to help themselves. The wholesome process of self-help can only be hindered by interference by Parliament, even although that may take the form only of frequent requests for information. It is right that the nationalised industries should be reminded that they are accountable to a properly vigilant Parliament; but there is much to be said for Mr. Watkinson's belief expressed in last week's debate, that there was a danger of making hypochondriacs out of nationalised industries. They were always, he pointed out, being invigilated, examined, questioned, and talked about in Parliament. As a result they were always getting knocked about in public, and their chairmen must often long to be able to get on with the comparatively simple task of running their own industries. Mr. Watkinson may have remembered that he as Minister had intervened more than once in the Commission's activities as regards fares.

There is some consolation in the undeniable fact that railway modernisation, as the Minister put it, already is "paying off" better than anyone—or most responsible people—thought. The Commission is placing orders for another 90 main-line diesel locomotives for delivery next year. That is over and above the 200 already planned for delivery in 1959, and should greatly improve railway revenue earning ability. This, as he was careful to point out, is not being done at the expense of the great electrification scheme. Diesel traction is an intermediate phase before electrification from atomic power. He was able also to tell the House that a reduction of over 12,500 in the staff had been made by British Railways up to the end of June, compared with the previous year; that is a considerable figure compared with a total of 570,000 employed on British Railways, especially when the shortages in certain grades which were obtaining a year ago are borne in mind. The London Transport Executive already is engaged on staff reductions, the necessity for which has been accentuated by the bus strike. There is a bright future for container and other door-to-door traffic. Finally, Mr. Watkinson rightly pointed to the good performance by the Commission's activities, such as hotels and catering, which in 1957 produced excellent results, and by Thos. Cook & Son Ltd., a subsidiary company. These activities may be small in relation to British Railways, but they show what can be done with efficient management.

What the financial situation of nationalised transport, and more especially British Railways, will be in 1962 only time will show. There is at least room for hope that it will be improved. Those concerned should be left to conduct these businesses as best they may, for there is no time to lose if financial equilibrium is to be achieved within the period allowed

Justifiable Apprehension?

THIS journal repeatedly has expressed the view that the primary functions of railway workshops are those of rolling-stock repair and maintenance. We do not subscribe to the theory of their suitability for the construction of complete units. Specialist manufacturers, and particularly those with many years of experience, are able to contribute knowledge and capacity quite as valuable as that possessed by the workshops, though of a different kind. The two sets of qualifications are analagous to the sides of a coin which, while bearing different designs, form part of the whole and a complement each to the other. Although an expert within his particular, but essentially broad, field, the railway engineer is not usually a specialist in every aspect of his work. His knowledge of the construction of every required unit cannot equal that of the outside manufacturer whose livelihood depends on the efficient and economic production and sale of a relatively narrow range of goods for highly competitive markets at home and overseas.

Railway workshops do not usually possess machinery designed for the manufacture of a specialised product. Their existence depends on their versatility. Also, an order may call for a limited number of items of the same kind. This, compared with the production line of a manufacturer engaged full-time on basically similar work, constitutes a relatively short run, which precludes the attainment of the same measure of economic working. The railway engineer can and should specify his requirements to the manufacturer of proven ability and long experience in the field. The railway workshops can and should be responsible for the regular and efficient upkeep of the complete product which, though manufactured outside, has been designed and built to railway specifications and often in close co-operation with the department concerned. The ideal situation exists when railway engineer and private manufacturer act in liaison to produce and maintain equipment to such a degree that it is difficult to state where the work of either side begins or ends. This state of affairs invariably is beneficial to both sides. Manufacturers have repeatedly and publicly acknowledged the "shop-window" value of British Railways, and, to take the matter on its most mundane level, will not willingly put out what amounts to a poor advertisement. They therefore have an excellent incentive for maintaining the quality of their products.

On the other hand, a strong case can be made for the near-exclusive allocation of railway repair and maintenance work to railway workshops. Here, the versatility of knowledge, training, and capacity—a drawback in the production of any one specialised and complex unit—is precisely what is required. In this type of work, the advantages are all with the railway engineers. They have the specialised ability and capacity: they have the right equipment: they are geared for just such work. Realistic inter-departmental accounting can and should ensure that true costing takes place: middlemen's profits are minimised and the resultant low-priced worksheet should ensure that adequate and regular servicing is carried out. This in turn leads to an increased safety factor and to long-term economies.

At the recent annual general meeting of the National Union of Railwaymen, grave concern was voiced at the amount of work claimed to be passing from railway workshops to private contractors. The view was expressed that the Government, through the British Transport Commission, was favouring private enterprise at the expense of the shopmen. We do not support this theory, if for no other reason than that the Commission is an autonomous body fully capable of, and jealous of its right to, the ordering of its own affairs within the overall authority of the Ministry of Transport & Civil Aviation. Nevertheless, it would appear from the anxious and numerous complaints made at the Exmouth meeting of the N.U.R. that a certain amount of repair and maintenance work is being contracted out. It would seem that a situation exists which merits investigation by the British Transport Commission.

The question is receiving the attention of both sides of the House of Commons. Within the past fortnight, Major Sir Frank Markham, Conservative Member for Buckingham, and Mr. Francis Noel-Baker, Labour Member for Swindon, have pressed for information on work programmes planned for the workshops. Both members have declared their intentions of obtaining a clear understanding of the position, and in fact it would appear that a close and impartial examination of workshop capacity would give useful results. This should be done before resentment becomes general so that both sides can be certain that justice has been exercised and an overall result, as economically satisfactory to all parties as is practicable, be achieved. In this connection, it is worth recording that Sir Brian Robertson, Chairman of the B.T.C., has stated categorically that the Commission has not lost its sense of responsibility towards its staff. There is no reason to doubt that, in matters of this kind, the most careful investigation will be given to any points that may be raised by the unions.

Development of Portuguese Oversea Territories

WHEN under-developed territories in both hemispheres are crying out for capital and indeed for comprehensive plans for developing resources, it is good to see that the Government of Portugal has decided on expenditure of 9,000 million escudos (about £113 million) under its second six-year development plan (1959-64) on what are today called the Overseas Provinces of Portugal—in effect the Portuguese colonial empire. A fair proportion is to be devoted to railways. The total amount is less than half of the 21,000 million escudos (£263 million) to be spent on Metropolitan Portugal; but the mother country badly needs capital development, especially of railway and other communications, of basic industries, and of technical education to enable it to play its part as chief of a group of interdependent countries. A small proportion of the £376 million is to be found by the colonial Governments. The plan is framed to ensure funds for activities considered essential, or which might otherwise be neglected. It is not intended to be as comprehensive as, say, the Indian five-year plans. Faith is being pinned in the encouragement given to private investment. In the light of experience with the first six-year plan, it is hoped that private investment in the mother country and overseas will reach a total of £593 million, over and above the £376 million provided for in the plan. This private investment is essential for satisfactory development of the regions concerned.

Under the plan, funds are to be made available for railway development in Angola, Mozambique, and Portuguese India, the only Overseas Provinces in which any considerable railways already exist. The others are islands, or too small in area to justify railway construction except perhaps at a later stage—in Portuguese Guinea, perhaps—to link up with lines in contiguous territories. In Angola, the metre-gauge Luanda Railway is to be widened to 3 ft. 6 in., presumably as a preparatory step to connecting up with other "Cape gauge" lines in Angola and the Belgian Congo; re-laying is to be extended, and rolling stock and other equipment acquired. Work on extending the Moçamedes Railway eastwards is to continue. Studies are to continue with a view to construction of the Baia dos Tigres Railway. The Congo Railway is to be joined to the Matadi-Leopoldville line in the Belgian Congo, so affording another link between that territory and Angola; this development is expected to result in relief to Matadi and in additional traffic through the port of Luanda. The port of Lobito Bay also is to be improved.

In Mozambique, work is to continue on the Mozambique Railway, on the 3-ft. 6-in. gauge. The section from Nova Freixo to Catur, which was included in the first development plan, will be completed and a survey made for extension of the railway westwards to Lake Nyasa. This would give the lakeside region a direct railway route to the Indian Ocean, alternative to that now provided by the Nyasaland and Trans-Zambesia Railways via the port of Beira. There are to be improved traffic handling facilities at Beira and other ports.

In Portuguese India, where the railway and the harbour of Mormugao are worked with great efficiency (and a low operating ratio for the railway) by the British concern, the West of India Portuguese Guaranteed Railway Co. Ltd., 48 million escudos (about £600,000) is to be spent on bridges, rolling stock, and workshops for the railway; about half the money needed is to be found from port and railway working surpluses. In addition, 60 million escudos is allocated to harbour improvements.

In Metropolitan Portugal the rest of the Lisbon-Oporto main line is to be electrified from Entroncamento northwards, and more diesel locomotives of 800-1,600 h.p. are to be procured for the Minho and Douro (broad gauge) lines and of 800-1,000 h.p. for the lines of the Vouga Valley and Corgo (metre gauge). Workshops will also require re-equipment and bridges in the province of Beira Baixa are to be strengthened. Signals and telecommunication systems will be modernised. Carriages and wagons are to be obtained from Portuguese builders. A total of 1,300 million escudos is to be spent on the Portuguese Railways.

In addition, between 1959 and 1961 a further line is to be built of the Lisbon Underground at a cost of 200 million escudos to be obtained by the issue of shares and debentures with a Government guarantee. It has been decided that the best means of providing a way of crossing the River Tagus at Lisbon will be by construction of a suspension bridge for road traffic, which is included in the present plan, and subsequent construction of a railway tunnel resting on the bottom of the river.

These are ambitious plans for countries with populations and *per capita* incomes as small as Portugal and her Overseas Provinces. They show faith in the future and awareness of the importance of adequate railway transport, without which there can be no extensive economic development. There is ample scope for British enterprise in supplying railway equipment of all kinds. It is to be hoped that the Commonwealth Conference, to be held in Montreal in September, will plan as generously—in proportion—and bear the claims of railway transport in mind in deciding on priorities.

British Railways Diesel Locomotive Policy

THE recent orders for 124 further diesel-electric locomotives spread over British Railways works and private contractors show that there still is no settled policy as to basic locomotive types and basic engine types so far appearing on British Railways. These orders result from the recent acceleration of the modernisation programme, which itself follows quickly on the deceleration occasioned last year by financial stringency. It is not to be expected that rapid changes of plan dictated by financial policy can promote either good selection of basis standard types or the maintenance of morale and interest among higher and lower grades. What seems to be needed first is not more orders for diesel locomotives but rather an assurance from the financial authorities of stable conditions on agreed levels for the next four or five years.

Of the two new orders, one, for 40 complete locomotives, is for a design already proved in service for some months, and one which, mechanically, seems to have given quite a good account of itself. But basically, taking the locomotive as a traffic unit, can the AIA—AIA wheel arrangement, 102 tons weight and 72 tons of adhesion weight be considered satisfactory for an engine output of 1,250 b.h.p.? Could it be considered satisfactory against modern standards even if the engine output was raised, as probably it well could be, to 1,400 b.h.p.? The second type now ordered is based on one of the designs ordered in the winter of 1955-56 but not yet in service; though the first one was delivered this week, and is described briefly elsewhere in this issue. It is of 1,160 b.h.p. and 75 tons weight, with Bo-Bo wheel arrangement.

Both types have low-speed oil engines, that is, not exceeding 1,000 r.p.m. Yet this should not be taken as an indication of any definite policy trend; there have been too many variations over the last three years. Of the 174 line-service locomotives ordered in the winter of 1955-56, only 8 per cent had quick-running engines of 1,400 r.p.m. or more, and only 1¾ per cent had a power : weight ratio better than 100 lb. per b.h.p. But of 239 further locomotives sanctioned between June, 1957, and June, 1958, high-speed engines are to be installed in 58 per cent, and 36 per cent of the 239 units will have locomotive power : weight ratios better than 100 lb. per b.h.p. Now the new orders alter these proportions again; and perhaps the next batch of orders will swing them back again. These things seem to depend much less on some central considered and adopted policy than on individual selection by the Regions principally concerned; but at least in regard to the two recent orders no engine types or transmission constituents new to British Railways are being installed, so that no fresh maintenance problems are being introduced. But the time is more than ripe for full consideration to be given to the effects of unnecessary locomotive weight on locomotive price and locomotive performance in a traffic sense.

Collisions in Fog

THE reports have been published this week by the Chief Inspecting Officer of Railways, Brigadier C. A. Langley, on the St. Johns and Dagenham accidents of December 4, 1957, and January 30, 1958, respectively; they will receive the usual more extended notice in our pages in due course. They show both accidents to have been caused by failure to observe signal indications. The type of equipment and form of working differed, however, in the two cases.

At St. Johns in the Southern Region electrified suburban area, the lines were completely track-circuited, and provided with multiple-aspect colour-light signals installed in 1929. Although in the peak hours a train passes through St. Johns every three-quarters of a minute, no accident fatal to passengers has occurred since then. The accident last December caused 90 deaths, including a guard; but this was largely the result of the unprecedented collapse of a bridge on to the colliding steam train which overtook an electric one stopped in consequence of a misunderstanding about a describer message. The inquiry was initiated by Brigadier Langley's predecessor, the late Lt.-Colonel G. R. S. Wilson, to whose skill in conducting the main part of the investigation his successor pays a high tribute in his report. The signalling was found to be in perfect order, and the driver of the steam train, an experienced man, is held solely responsible for the accident. It is clear that he did not see the two warning aspects located immediately to the right of the track on which he was running, and did not ensure that his fireman looked for them. He was, therefore, taken by surprise by the red aspect at a place where he had never been stopped before. It was then too late to do anything effective. The driver was tried for manslaughter, but the jury could not agree on their verdict, and he was discharged.

No alteration in the position or spacing of the signals at or near St. Johns is recommended, nor any change in the order of the priorities of the present programme for installing A.T.C. The latter is, rightly, being concentrated on sections worked by older methods of signalling. A.T.C., however, is to be applied to multiple-unit colour-light signals in one course. The report emphasises that what is called warning control might have prevented 31 per cent of the deaths in train accidents in the 46 years from 1912 to 1957. Had a train stop effect also been available, the figure would have risen to only 38 per cent, and "the cost of installing both systems would in no way be commensurate with the advantages obtained."

In the Dagenham accident on the steam-operated London, Tilbury & Southend Line of the Eastern Region, through which 10 people were killed, the evidence proved much harder to sort out. Block telegraph was in operation, with a certain amount of proving and other controls, including some track circuiting with intermediate block, home, and distant signals. Matters were complicated by switching-out facilities; investigation showed that these in certain circumstances could result in a false "line clear" block indication being shown and perhaps acted on. A signalbox in fact was closed just before the accident; the rules, inherited from the days of L.M.S.R. management of the L.T.S. Line, allowed this to be done with occupied sections under due precautions. It became necessary, therefore, to consider every possibility very carefully. Brigadier Langley considers, however, that the enginemen of the colliding train had missed a starting signal in the fog.

They had been allowed to go forward to it, despite the weather, as the rules permitted this, and the line was track-circuited. They then became encouraged to proceed by receiving clear distant signals with A.T.C. indications after the closing of the signalbox ahead. Finally they came on the obstruction unexpectedly. The Inspecting Officer is satisfied that all the equipment, both signalling and A.T.C., was in proper order; also that an irregular line clear block indication was produced during the switching out. He recommends that consideration be given to altering the rules, to prohibit the sending of trains to starting signals at danger in fog unless they are colour lights or are fitted with co-acting detonators, with any explosion indicated in a signalbox. Colour-light is, however, to be installed on the L.T.S. Line concurrently with electrification; this will eliminate conditions such as those which contributed to the accident at Dagenham.

The drivers questioned spoke well of the A.T.C. apparatus used for some years on the Tilbury Line, where fogs are frequent. They emphasised how much this equipment helped them to find their position when visibility was bad.

Letters to the Editor

(*The Editor is not responsible for opinions of correspondents*)

Motive Power Policy

July 20

SIR,—Two days after the beginning of the present Middle East crisis British Railways announced a speeding up of their diesel locomotive programme, with ordering of a further 120 units. This follows soon after a statement by the National Coal Board of a further expected surplus of small coal.

Is it not time our diesel programme was overhauled? In this country a diesel locomotive appears to have few advantages over steam. We should build or convert locomotives to burn small coal, using mechanical stokers, at least until atomically generated electricity becomes abundant.

Yours faithfully,

J. B. LATHAM

Channings, Kettlewell Hill, Woking

Glasgow Suburban Services

July 18

SIR,—In your issue of July 11 there is an announcement that the train service on the line to East Kilbride beyond Busby will be closed every evening after 7 p.m., and after 2 p.m. on Saturdays. This should not be allowed to pass without comment, for it represents a lamentable failure on the part of British Railways to attract new taffic in conditions which must surely have been unusually favourable. East Kilbride is a new town and several large residential areas have recently been built within easy walking distance of the existing station.

No effort seems to have been made to encourage new residents to use the railway. The average time for the journey of 11½ miles to Glasgow Central is well over half-an-hour, and the rolling stock is old and shabby. It is not surprising that these people consistently prefer to use the buses, which take just about the same time to reach the centre of Glasgow.

Some months ago I wrote to the railway authorities to complain of the shabby state of these trains, and I suggested then that they had a great chance to bring in new business. If this had been canvassed energetically a year or so ago, and if diesel trains running at regular intervals and doing the journey in, say, 25 min. could have been introduced, it would have become customary to travel to Glasgow by train. Now, however, if any of the local people are asked about trains to Glasgow they will tell you that the buses are much better—and, as things stand, they certainly are. This latest announcement suggests that British Railways have accepted defeat on this service. This is altogether the wrong attitude. They might still build up a substantial business there if they tackled the situation with enterprise. One is left wondering how many other branch lines have been allowed to drift into decay through similar lack of initiative.

Yours faithfully,

W. R. D. MANNING

Red Cottage, Townsend Avenue, St. Albans

THE SCRAP HEAP

Seven Miles Against Signals

A goods train on the New Zealand Government Railways is reported to have travelled for seven miles against signals along the single-track main trunk line in the North Island. Only when detonators were exploded on the track was the train stopped. It ran through several stations and through yards at Waikanae and Paraparamu. The train crew is stated to have given no sign of life. Tablets were not exchanged at ends of sections. Eventually detonators were placed on the track on orders from headquarters.

A Canadian Railway Centenary

This year marks the 100th anniversary of the inauguration of railway traffic between Halifax and Truro, Nova Scotia, on what is now part of the Canadian National Railways main line. In 1858, the Nova Scotia Railway, the first publicly-owned railway in Canada, opened for business, including the first "piggyback" transport ever offered by a Canadian railroad.

Genesis of Victoria Station

Notwithstanding the threatened opposiiton the Bill [authorising the Battersea to Victoria line] has passed ... Royal Academicians contended that it would be most improper to exclude from the full view of those who drove along the embankment from Vauxhall, or who travelled up the river in a steamer, the new structure called Chelsea-bridge. [They] declared that such a proposition would not be "*æsthetic.*" . . . It is said that within two years from the present time we shall find the thoroughfares of the metropolis greatly relieved by the traffic to London Bridge being diverted from its present route, and made to pass over a new line commencing at the head of the Grosvenor Canal, not far from the Royal Mews of Buckingham Palace. The capital is £675,000, of which the Brighton Railway Company takes two-thirds.—*From "The Times" of July* 14, 1858.

Furness Railway Relic

Photo] [D. J. W. Brough

Disused signalbox of the former Furness Railway at Carnforth, L.M.R. Note clockface and bricked-up fireplace; the box was part of buildings now demolished

Left Behind on London Transport

More than 456,000 articles, ranging from 13,000 bunches of keys to several hundred children's push chairs, were left behind by passengers on L.T.E. buses and Underground trains last year, according to the London Transport annual Lost Property Office report. Folding push chairs were mostly left behind under bus stairways, when parents are busy getting the children off buses and forget the prams. Some 37,500 miscellaneous lost articles, including an artificial leg left on a bus when being taken for repair and later reclaimed, and a pair of crutches which went to auction when no owner came forward. Over one-third of the articles were claimed and restored to owners.

Badly Loaded Tanks

In view of the great scale of movement on railway wagons, during and since the last war, of tanks—many of considerable size and weight—other armoured fighting vehicles, large guns, recovery vehicles, and so on, accidents through bad loading have been comparatively rare. A recent example is the mishap a few days ago on the Belgian National Railways near Herbesthal, on the Belgo-German frontier, when a tank loaded on a flat wagon is stated to have hit the coaches of a Brussels to Berlin train on a parallel track, injuring several passengers. A good many railways have reported wear damage to journals caused by tanks and other heavy military consignments not being properly centred when loaded on flats.

Modernisation Progress Chasing

The Great Eastern Line of British Railways, Eastern Region, has devised a competition, known as "Progress Chasing," for boys and girls aged 11-16, which is open until September 20. The object is to increase interest in railway modernisation, to stimulate interest in railways as a career, and to encourage travel by rail amongst children, many of whom travel everywhere in parents' cars and have little idea of what a modern railway is like.

Children are invited to enrol at the Great Eastern station nearest their home or holiday address, and are given a "progress chaser's" badge, which portrays a 1,250-h.p. Brush diesel, and official card, and report forms to record examples of modernisation observed during their journeys on the Great Eastern Line. Special reduced fares are in many cases available. The completed forms are returned to a Great Eastern Station and will be collated and assessed for prizes. The fact that there is less modernisation work in some areas than in others will be taken into account. The judges will be Mr. W. G. Thorpe, Line Traffic Manager, Mr. G. W. Brimyard, Public Relations Officer, Great Eastern Line, and Mr. Cecil J. Allen, well known as a writer on railway subjects. The prizes will include free two-day visits to London with rail travel and hotel accommodation and visits to railway installations; trips in cab of an express steam or diesel locomotive; visits to marshalling yards, signalboxes, motive power depots, goods stations, and control rooms; and free first class tickets for one journey between any two Great Eastern stations.

Arresting Intelligence

A 15-year-old girl "arrested" one of three boys—two aged 12 and one aged 11—who wrecked the coach of a Piccadilly Line train in which they were travelling. The boys appeared before Uxbridge juvenile magistrates. They tore down an advertisement in the carriage. One boy took out electric light bulbs. The others threw them through the doors. The girl, the only other passenger in the carriage, caught hold of one of the boys when the train stopped at Ruislip and took him to a ticket collector . . .The boys were given a conditional discharge and told to pay 30s. costs each.—*From the "Evening Standard."*

Station into Air Terminal

Air France has just done the nearest thing to pouring new wine into an old bottle, and made a success of it. A new air terminal station has been put into the shell of an old railway station. The Aérogare departure terminal at the Invalides has been shifted from the hall above ground to the space in the tunnel where at one time there were railway lines. It has been built to handle up to 1,000 outgoing passengers an hour. . . . All I hope is that the Seine will get out of its habit of flooding this region every few years. Otherwise passengers will presumably have to book in from canoes.—*From "The Daily Telegraph."*

[The third-rail electric train service between the part of the Invalides Station not used as an air terminal, and Versailles Rive Gauche, is not affected. For some distance from the Invalides the line is subject to flooding. The few main-line trains that ran from and to Invalides were diverted to the Montparnasse terminus some years ago; they were hauled by electric locomotives to and from Versailles. Invalides Station normally was not used to anything like capacity.]

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

INDIA

New Station at Pandu

A new station, with permanent buildings, is under erection at Pandu, in Assam, on the North-East Frontier Railway, the left-bank (southern) terminus of the Pandu-Amingaon ferry across the Brahmaputra. This is believed to be the first permanent structure at Pandu since the railway was first built many years ago. Temporary buildings were erected, partly because of the many earthquakes in this district, and partly because of the rise and fall in the level of the Brahmaputra.

VICTORIA

"Piggy-Back" Transport Test

A trial was made recently in Melbourne of "piggy-back" transport. A heavily laden road semi-trailer was driven into a goods yard at Melbourne under a large gantry crane, stripped of its road wheels and lowered on to a long open wagon. A few hours later the vehicle was on its way to Adelaide. The freight was 14 tons of paper. The specially adapted railway wagon used will carry two loaded 34-ft. road vehicles each weighing up to 16 tons. It was a South Australian Railway "OA" open bogie wagon specially adapted at the Victorian Railways Newport Workshops, one of the long open vehicles designed for the conveyance of motor car bodies between Adelaide and Melbourne; it was originally built at the S.A.R. Islington workshops.

Piggy-back transport is used successfully on the Trans Australian line of the Commonwealth Railways. It is felt in Victoria that it could form an important part of Sydney-Melbourne traffic when the standard-gauge track is completed to Melbourne.

Doubling

Subject to funds being available work is to begin next year on doubling the Melbourne-Geelong line. The project is expected to take three or four years to complete. Traffic conditions will be progressively improved as each section is dealt with and the double line extended.

Station Car Parks

The railways have made a survey of stations round Melbourne outside the nine-mile limit to see if any more could provide a parking area for cars of train travellers. Some municipalities are co-operating by providing car parks near railway stations; parking space is available at about 40 suburban stations.

WESTERN AUSTRALIA

Hot Water System for Coaches

The supply of hot water for use in hand basins and showers on country train services has been facilitated by provision of new oil-fired boilers in the Perth carriage sheds. The boilers have a capacity of 1,600 gal. They are automatically fired whenever the water temperature drops below the required minimum. The hot water is conveyed through insulated pipes to several points inside the carriage sheds whence it is fed into the insulated tanks of the carriages.

Formerly each coach which required hot water had to be shunted to a wood-fired boiler; and this movement often caused congestion of tracks into the sheds.

CANADA

Freight Association Convention

For the second time in four years, the Canadian Freight Association recently chose Prince Edward Island for its summer sessions. At the Canadian National Railways' Charlottetown Hotel, representatives of several Canadian railways studied rate and freight handling matters during a four-day meeting. The group meets monthly in Toronto throughout the year, except for the summer sessions.

ARGENTINA

Fiat Diesel Plant in Cordoba

Since the recent agreement signed with Fiat of Turin (see our issue of March 7), that firm has decided to construct a plant for building diesel locomotives and railcars and coaches and diesel engines in Ferreira, near Cordoba, constituting a local company under the name of Materfer.

Of the 210 railcars ordered at a cost of U.S.A. $28,240,345, 90 are to be built in Italy, to be delivered within 14 months, and the remainder in the new plant, with a 22-month delivery date. The plant will cost some $1,500,000, will employ 600 Argentine workers, and will also produce underground railway coaches and trams.

Spares and Equipment from Britain

Spare parts and equipment to the value of £815,435 were received from Britain during the months of April and May. These purchases were made as a result of the recent £5,000,000 loan.

UNITED STATES

Grand Central Skyscraper

The New York State Realty & Terminal Company, a subsidiary of the New York Central System, has now decided to lease part of its site adjacent to the Grand Central Terminal, New York, for the building of the long-projected skyscraper. This will be 50 stories and will cost approximately $1,000,000: it will be due for completion in 1961. The floor area will total 3,000,000 sq. ft., or 50 per cent more than that in the Empire State Building.

The new building will replace the old six-storey Grand Central Terminal Offices, rising above the station plat-

Freight Working in East Africa

Empty tank wagons hauled by "59" class Beyer-Garratt locomotive ascending the Rift Valley escarpment en route to Mombasa, East African Railways & Harbours

forms; it will provide for the expansion of baggage facilities, and will include a garage. The plot will cover 132,000 sq. ft.

For many years past the New York Central and the New York, New Haven & Hartford Railroad, which also uses the station, have disputed ownership of the property on which the building will stand. But as the annual loss on the station operation is in the region of $6,000,000, and the revenue from the new building is estimated at $1,000,000 per annum only, no question as to division of profits from rentals is likely to arise, for the present at least.

ITALY

Further Electrification

The following sections of the State Railways are scheduled for electrification at 3,000 V. d.c.; and work is reported to have been begun in certain cases: Bergamo - Usmate; Voghera-Piacenza; Mestre-Treviso-Udine; Castelbolognese-Ravenna; and Foligno-Terontola.

Conversion of the Voghera-Piacenza line will make the shortest direct connection between the Milan-Bologna and Milan-Genoa lines. That of the Foligno-Terontola line will enable this line to be used for routing electrically hauled trains for the Ancona-Florence line, so avoiding Orte. Perugia and Assisi will benefit considerably. Electrification of the Ponte S. Pietro-Usmate line will allow improvements to be made to the suburban trains to and from Milan. Electrification between Castelbolognese and Ravenna has been decided on in view of the advisability of connecting Ravenna with the electrified Adriatic network because of industrial development.

WESTERN GERMANY

Automatic Coal-Bagging Plant

The Federal Railway has placed in service plant for the unloading of coal for domestic use; it is put into sacks on the unloading of wagons. A crane takes the coal from the wagon and drops it into a 5-ton silo, from which it is then unloaded by the 100 kg. (220 lb.) on to a scale for bagging, and is distributed in bags direct from the station to the consumer.

Transhipment of Coal Briquettes

The Federal Railway for a long time experienced difficulty in transhipment without damage of coal briquettes from wagons to ship at the Bavarian inland port of Regensburg (Ratisbon), on the Danube. The briquettes tended to break when transferred manually, by shovel.

Special containers, known as Eos(pa), recently were placed in service. The interior walls of the containers are smooth, to allow briquettes to slide easily, and there is an aperture on top, which can be opened by a lever. Each container conveys five tons of briquettes, and four containers are borne on a specially designed wagon.

In transhipment, a port crane takes the container from the wagon to a position above the hold. The aperture in the top is opened by the lever, the container is tipped slowly, and briquettes slide slowly into the hold without breaking.

BELGIUM

Rail Hostesses

Sixteen "rail hostesses" are now employed by the National Railways, largely at Brussels stations, to assist passengers visiting the International Exhibition. The uniform is royal blue, with a forage cap and white blouse.

U.S.S.R.

"Red Arrow" Accelerated

Since the introduction of the summer timetable, the "Red Arrow" express between Leningrad and Moscow has been accelerated by 1 hr. 45 min. each way, reducing the former time of 9 hr. 40 min. for the 404-mile journey to 7 hr. 55 min. The train leaves each city at 12.20 a.m. and arrives at the other at 8.15 a.m. This has been made possible by the introduction of diesel locomotives in place of the 4-6-4 and 4-8-4 steam locomotives previously used; the former stops at Mala Vishera and Kalinin have been omitted, leaving only one 10-min. stop, at Bologoe.

On the same line, a fast afternoon and evening train, also diesel-hauled, has been introduced from Moscow and Leningrad at 2.30 p.m., arriving at the other city at 11 p.m., giving a journey time of 8¼ hr. with three stops. Previously all express trains between the two cities ran at night.

Publications Received

Railway Track. Design, Construction, Maintenance, and Renewal of Permanent Way. By K. F. Antia. Fourth edition, December, 1957. Bombay, India: The New Book Private Ltd., 188/190, Dadabhoy Naoroji Road. 8¼ in. × 5½ in. 447 pp. Illustrated. Price Rs. 16.—At least one of the earlier editions of this work has already been reviewed in our pages. The fourth edition includes further revision based on results of the latest investigations and practice. More efficient track maintenance and special emphasis laid on the theory of track stresses are features of this edition. In an 18-page chapter the whole subject of these stresses is discussed in some detail on the basis of research carried out in India and elsewhere. The theory of elastic track and net or virtual wheel loads relative to speed, hammer-blow and of the reciprocating locomotive effects together with track modulus are first explained. A formula—based on Indian research—is mentioned for deflection at various speeds in terms of effective mass and damping effects, from which a bending-moment formula giving longitudinal stresses is reduced and a speed increment factor is obtained. The effects of curvature and locomotive oscillation and balancing and relevant matters are adequately covered and illustrated by diagrams and graphs; actual examples are quoted with tables and formulae. Finally, the lateral thrust exerted on the track by locomotives and the lateral strength of the track are thoroughly discussed. Altogether a valuable contribution to track bibliography.

Extrusion Press Components.—A booklet of 20 pages describes the construction and production of components for extrusion presses, manufactured by Hadfields Limited, East Helca Works, Sheffield, 9. Copies may be obtained on application to the company.

B.R.S. Special Purpose Vehicles.—British Road Services has issued a new illustrated leaflet describing some of the many different types of special purpose vehicles which traders may hire on contract from B.R.S. (Contracts) Limited. Many of these vehicles are fitted with special bodies for individual contracts. Examples are: tippers and tankers for commodities in bulk; refrigerated and insulated vehicles; low loaders for machinery; and bolster fitted vehicles for carrying long steel girders, timber, and so on. All are hired for the exclusive use of individual traders with particular transport requirements. B.R.S. (Contracts) Limited already operates a large fleet on contract for a wide section of leading industrial and trading concerns in the British Isles. The leaflets are being distributed widely to traders throughout the U.K.

Coles Cranes—In connection with the introduction of a new range of Coles cranes, Steels Engineering Products Limited has published a catalogue containing crane specification leaflets with weights, dimensions, and so on. Copies of this catalogue may be obtained from Steels Engineering Products Limited, Crown Works, Sunderland.

More Power to Your Elbow.—This booklet describes the range of Westinghouse pneumatic equipment now available in this country. Various devices for control, positioning and auxiliary purposes are described, besides compressors and supply fittings. Examples of typical installations are also included, in which are featured a British Railways Rolls-Royce engined diesel railcar, and a tipping dump wagon built by Head Wrightson & Co. Ltd. The booklet can be obtained from the Westinghouse Brake & Signal Co. Ltd., Hanham Road, Kingswood, Bristol.

Seventeenth International Railway Congress

Problems Concerning the Ageing of Bridges and Viaducts

Effects of fatigue and corrosion in steel bridges and weathering in masonry: methods of maintenance, repair and strengthening

QUESTION 1 to be discussed at the forthcoming session of the International Railway Congress in Madrid was addressed to 109 railway administrations in different countries. As this was considered to be an unduly large numbering 35; (*b*) the other 74 mostly practices varied considerably on the different railways, it was decided to divide them up into two groups: (*a*) those in English-speaking countries or conversant with British practice, numbering 35; (*b*) the other 74, mostly conversant with French or other Continental languages and practices. The report summarising the replies from group (*a*) was dealt with in our issue of June 27.

From the 74 in group (*b*), detailed replies were received from only 25, namely: the Belgian National, Belgian Light, Bas Congo-Katanga, Upper Congo—Great African Lakes, Matadi-Léopoldville, Danish State, National System of Spanish, Finnish State, French National, S.G. Economiques, Algerian, Cameroons, French West African, Franco-Ethiopian, Viet Nam, Hungarian State, Italian State, Luxembourg National, Netherlands, Portuguese State, Swiss Federal, Damas-Hama (Syria), Tunisian National, and Jugoslav State Railways, and the Ministry of Transport in Czechoslovakia. Their replies were summarised by Dr. Ing. G. Cividalli, Chief Inspector of Permanent Way & Works, Italian State Railways.

The questionnaire is divided into four main parts covering: (1) general considerations, (2) metal bridges and viaducts, (3) bridges and viaducts in masonry and concrete, and (4) inspection and maintenance of all types of bridge. The report is noteworthy for its wealth of tables, diagrams and illustrations. As the reporter has preferred to discuss part (1) last, his summaries of the answers to part (2) are first dealt with below.

Strength and Stability of Metal Bridges

The replies received from the different railways show that there is considerable variety in the methods used to check the strength and stability of old metal bridges and viaducts. Some administrations do so on the basis of a typical train-loading or a percentage of it, whereas others use actual maximum loadings. However, most replies point out that the general state of maintenance of the bridge must, in any case, be considered. The effects of fatique appear to be taken into consideration by only a few of the railways replying, and those who do, take them into account without making distinction between old and new structures. The more important replies from 12 administrations are given in a table showing (1) the weights, uniformly distributed, of the locomotive and of the tender, of the typical train; (2) supplementary stresses due to lateral forces, braking, wind, dynamic stresses, temperature and effects of fatique; (3) admissible tensile and compressive stresses in existing iron and steel and in new bridges, and (4) remarks.

Tests on the Metal Components

Although most of the railways consulted have carried out a certain amount of occasional testing on components of old bridges, only the Czech and Hungarian appear to have done so systematically. The former administration found that these tests showed satisfactory agreement with the results of tests made prior to 1885. The apparent limit of elasticity, resistance and elongation to breaking were practically identical. The Hungarians tested material from nine iron bridges built between 1865 and 1896 and found that as regards resistance and elongation to breaking it did not conform to the original specifications; however authentic records show that these materials did not comply with regulations when the bridges were built. The results of these tests are tabulated in the report, and show that for the actual stresses and for repetitive loadings—averaging 230,000 and with a maximum of 700,000—no signs of fatique or ageing were apparent, though there was some reduction in elasticity. However, the elastic limit, breaking load, and percentage elongation varied considerably in the different specimens tested.

Generally, the administrations are divided as to whether ageing can appreciably affect the strength of the metal. Owing to unfavourable results of tests on materials from old bridges, some fix remarkably low stress limits for wrought iron. The S.N.C.F. and others tend to take the opposite line. In view of the wide discrepancies between the results of the various Hungarian tests, the reporter considers that the character of the iron must have changed because of the different conditions under which the different components had functioned. These changes are also due to corrosion and fatigue resulting from defects in design, in his view. He reminds his readers that the strength of an old iron bridge does not depend on the average resistance of the material, but the resistance at the weakest point.

In reply to a question as to what methods are used to examine metal bridges, the general method in detailed examination appears to be essentially visual, with particular scrutiny of members where there is a sudden change of section, at field-erection points, and where isolated patches of rust suggest hidden cracks. Rivet-tightness is usually confirmed with a hammer. Inspection of the general state of repair of a bridge sometimes includes checking bearing levels, and those at the middle of the decking. Most administrations check versines and also stresses with various types of extensometer. A few search for cracks by the magnetic method and examine welds by X-ray or with ultrasonic tests. Pulsator machines are occasionally used to determine the proper frequency of vibration in a bridge and its damping out, or sometimes for breaking.

Regarding different types of deterioration, their relative frequency and whether their cause is fatigue or defects in materials, design or construction, or corrosion, poor maintenance or other causes, replies show how difficult it is to classify deterioration according to its causes. Opinions differ widely on certain causes, and especially on deterioration due to fatigue, as already indicated. An eight-page table pinpoints the views of the various administrations on all these causes. Defects resulting from faulty material are reported as extremely rare, but those due to defects in design are common in old bridges. In many cases they are the primary cause of fatigue and cracks. The most usual defects in the construction of old bridges are bad riveting and cut surfaces not filed or ground down causing cracks.

Defects in Metal Bridges

The greatest defect in metal bridges, however, is corrosion, generally due to faulty design either allowing water to accumulate or making painting difficult. Certain administrations stress the effects of inadequate maintenance and others mention smoke fumes attacking the metal. Among the principal defects in the main girders of plate-girder bridges are rust set up between the plates, cracks in the angles securing the flanges to the web in line with the bearings, corrosion of the web where in contact with the macadam of road bridges, and also if it is in contact with the decking—especially if the latter is water-tight—internal corrosion in box-girders or corrosion in the upper flanges of open deck spans. Most of these defects are also found in truss-spans. Other defects mentioned take the form of rivets out of line due to eccentricity in the erection of members and chords; there is also damage resulting from derailments and collisions. In old bridges it has been found that defects in wind-bracing are common.

Decking-plates are among the parts most affected by corrosion, and cracks in reinforced-concrete decking are also common. Stone and R.C. bearing blocks are liable to chipping and splitting due to vibration and to the movement of small spans improperly secured. It appears that allowance is not generally made in the design of bridge members for future loss in section as a result of corrosion. Lead paints are the most usual protection against corrosion, though bitumastic, aluminium and zinc paints are used by some administrations. Thorough preliminary scraping and wire-brushing are essential. The average period between paintings would seem to be about five years. Two railways use galvanisation as protection for bridge steel-work, and one uses chrome—or copper—steel in big bridges.

With regard to experience of welding in the repair and strengthening of old bridges there is no unanimity among the administrations consulted. Most of them seem to be very cautious in adopting this practice. Several will not entertain it, though others have found it satisfactory for both iron and steel.

Replies to a question about strengthening metal bridges to enable them to carry heavier loads, indicate that nearly all railways habitually carry out such works. The latter usually take the form of adding new components and reinforcing or strengthening existing ones. On some railways, however, the construction of intermediate piers is undertaken to halve the lengths of spans, and the complementary reinforcement of members to resist shear corresponding to the new supports. Additional main girders are also frequently used, either by inserting a third between double tracks or by duplicating the existing girders. Sometimes the main girders are reinforced with trusses either underslung beneath them or overhead as arches springing from the upper- or from the lower-chord members. Cross-girders are also strengthened by under-trusses.

To Strengthen or to Rebuild?

The next question asks each administration whether it considers it "advantageous in general to strengthen bridges to enable them to carry heavier loads." Also what factors are considered in estimating the advantages of strengthening old bridges still in good condition rather than replacing them with a new bridge? The replies to this question are many and various. In the older countries where the earlier bridges were largely built of wrought iron, some administrations think it is worth while to strengthen such bridges by reinforcing their members. Others take the opposite view. Almost all, however, agree that it is worth while to strengthen steel bridges, though some would limit this work to the smaller as opposed to the main parts of any bridge. As the report points out, there are other major factors to be considered in deciding whether to strengthen as opposed to reconstructing; these are relative costs and interference with traffic, the availability of funds and materials, and the expected life of the strengthened bridge. One railway states that it is prepared to spend up to 30 per cent of the cost of a new bridge on strengthening.

Masonry and Concrete Structures

Part 3 of the questionnaire dealing with these structures considers such matters as defects in materials, design and construction, atmospheric conditions and deterioration, inadequate maintenance, settlement in the foundations and other causes of damage in these structures. Several railways attribute damage to poor-quality sand, bricks, stone or cement. Alkaline reactions and impurities in cement and concrete are often considered responsible for failures, but half the administrations replying find that faulty design is a serious cause of subsequent trouble. Some of the principal defects in concrete structures mentioned are inadequate expansion joints and reinforcement. In masonry bridges adequate and easily-cleaned drainage is considered most important. The replies as a whole point out that cases of faulty execution of construction are rare, but atmospheric conditions and ageing are considered frequently to be the cause of damage; frost is particularly mentioned in this connection. In fact, one railway states that it has abandoned brick construction because of its vulnerability to frost, but it must be remembered that R.C. structures also suffer from this trouble.

Inadequate maintenance is seldom reported, though blocked drainage is sometimes culpable especially if followed by frost. Ground-settlement seldom appears to be a cause of trouble except in mining areas. Another cause of damage mentioned by several administrations is the effect of smoke on concrete causing cracks and exposing the reinforcement.

Most railways report that inspection of masonry and concrete bridges is primarily visual, but many of them say that this is followed up by a variety of tests. These include checking the levels, tests of load, vibration, mechanical and superficial spot tests, samples of internal masonry, as well as resonance, dynamic and several other methods of testing. To protect the masonry from internal moisture various waterproof coatings are used by different railways; they also discuss the methods used to protect these coatings from damage caused by gangmen and traffic. External protection is seldom necessary but cement-mortar and fluoride coatings are occasionally used for this purpose.

There is considerable variety quoted in the methods used to repair masonry and concrete bridges. They include cement grouting, insertion of metal tie-bars, cutting out seams, provision of additional arch rings, and the use of strutting and trusses to bind piers.

Inspection and Repair Staff

The penultimate subject covered by the report deals with the general inspection and maintenance of both metal and masonry and concrete bridges, mainly from the personnel point of view. Seven railways say they have no mobile gangs specialising in the inspection and repair of bridges. Others do employ small gangs, and a few state that they have a number of large gangs. In general the size seems to vary from three to 40 men and they are supplied with all the normal equipment.

According to local requirements, either small or large bridge-workshops are to be found on most of the railways replying, especially where there is no provision of mobile gangs and workshop equipment. On one system, of the 390 men employed by the Bridge Department, 320 are in its workshops and 70 more out on inspection and maintenance.

Eleven administrations carry out part of their bridge maintenance and repair works themselves—usually the smaller works—and employ contractors for the remainder. Generally, it would seem that where there are good road-networks giving access to bridges without great difficulty, it is more advantageous to employ contractors wherever they are available and suitable; they usually supply their own materials. A few railways report that small bridges—presumably bridge-spans—are removed and taken to either railway or contractors' shops for repairs; one railway treats all spans of up to 11 ft. 6 in. length in this way.

General Considerations

Finally, the reporter returns to and briefly deals with the first sub-question under the above heading. First, when designing each type of new bridge how do you estimate its reasonable expectancy of life in normal service, and secondly, what is the actual life found by experience? The replies to Part 1 are embodied in a table, but the estimates are obviously made solely to introduce an amortisation coefficient into their budgets, and make no distinction between the various types of structure. Choice of structure is seldom influenced by expected longevity and generally depends on such local conditions as permissible construction height, available construction materials, time to completion, and traffic considerations. In general, however, the expected life of a metal bridge varies from 50 to 100 years and that of R.C. bridges from 75 to 120 years, or 200 for concrete arches. Masonry bridges may be expected to remain in service from 75 to 200 years, or in some estimates, infinity.

Replies show that it is very difficult to state the actual life of each type of bridge, but the general opinion seems to be that 80 is the normal life-span of a metal bridge and, in fact, figures for all types quoted closely adhere to the estimated figures above, with one reservation. This is made by the S.N.C.F., which believes that metal and R.C. bridges exposed to smoke will last only 40-50 and 30-50 years respectively —drastic reductions.

Braking Control Equipment

Use of rubber valves and diaphrams in Oerlikon-designed units

A SOURCE of expense in maintenance of brake control equipment is the wear of metallic slide valves, pistons, and so on. A distinctive feature of the compressed air and vacuum control valves in the brake equipment designed by Oerlikon and now in current production under licence at the works of Davies & Metcalfe Limited, Romiley, near Stockport, is the use of hard synthetic-rubber valves. These are operated by patent self-sealing rubber diaphragms. In this equipment metallic slide valves and pistons are eliminated and thus, it is claimed, the amount of wear, and consequently maintenance costs are reduced. The valves are largely constructed of corrosion resistant light alloy, thus effecting a substantial reduction in weight.

A typical example of this type of valve which is fitted to a number of control units used in the Metcalfe-Oerlikon braking equipment, is the driver's air brake valve. The operation of this valve when braking is shown in Fig. 1. Movement of the control handle 1 compresses the regulating spring 2, flexes the diaphragm 3, and the hollow stem valve 4, lifts the inlet valve 5 off its seating. This allows air from the main reservoir to flow into and operate the brake cylinders, no reducing valve being required. The pressure admitted to the cylinder is dependent upon the position of the control handle, as this determines the amount which the regulating spring is compressed. When the spring load is balanced by the air pressure load on the underside of the diaphragm, the diaphragm lifts and allows the pressure inlet valve to close.

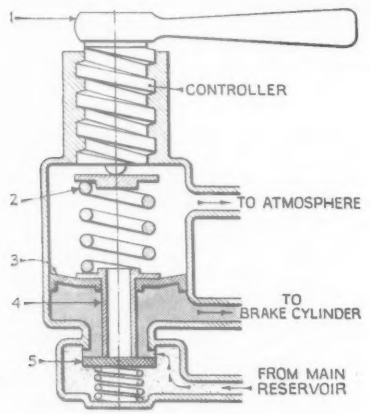


Fig. 1—Diagram of Metcalfe-Oerlikon air brake valve control unit

The selected brake pressure is then automatically maintained in the brake cylinders, as should any leakage occur to cause a pressure drop in the system the regulator spring would immediately cause the inlet valve to open and admit sufficient air to restore the pressure balance in the valve.

The action of the valve during brake release is shown in Fig. 2. Movement of the control handle to any required release position reduces the regulator spring load. The brake cylinder air pressure lifts the diaphragm and hollow stem valve 4, thus allowing air from the brake cylinder to flow through the hollow stem to atmosphere. At the reduced braking pressure corresponding to the pre-set position of the control handle the release valve closes and holds the required pressure. In the case of full release the valve remains open until the brake cylinder spring has returned the piston to the end of its stroke. Both during braking and release the valve is thus completely self-lapping and it is claimed that due to the absence of sliding parts the valve is very sensitive to pressure control changes.

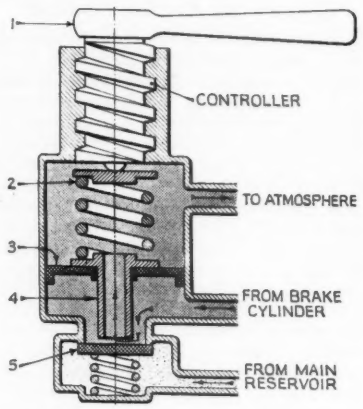


Fig. 2—Air brake valve, showing action during release

Construction

The constructional details of the F.D.I. valve are shown in Fig. 3. It will be seen that the only adjustments provided are the two stop bolts controlling the maximum brake cylinder pressure and the release position. An interesting feature of the design is that the pipe connections are screwed into a base plate, to which the valve is attached by two socket-head screws. This enables the complete valve to be

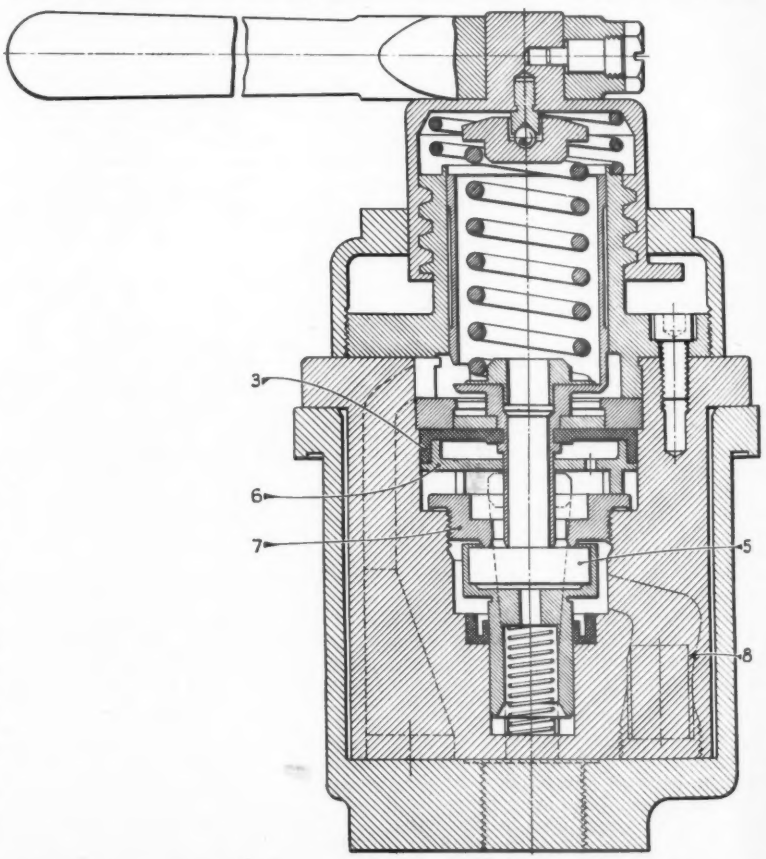
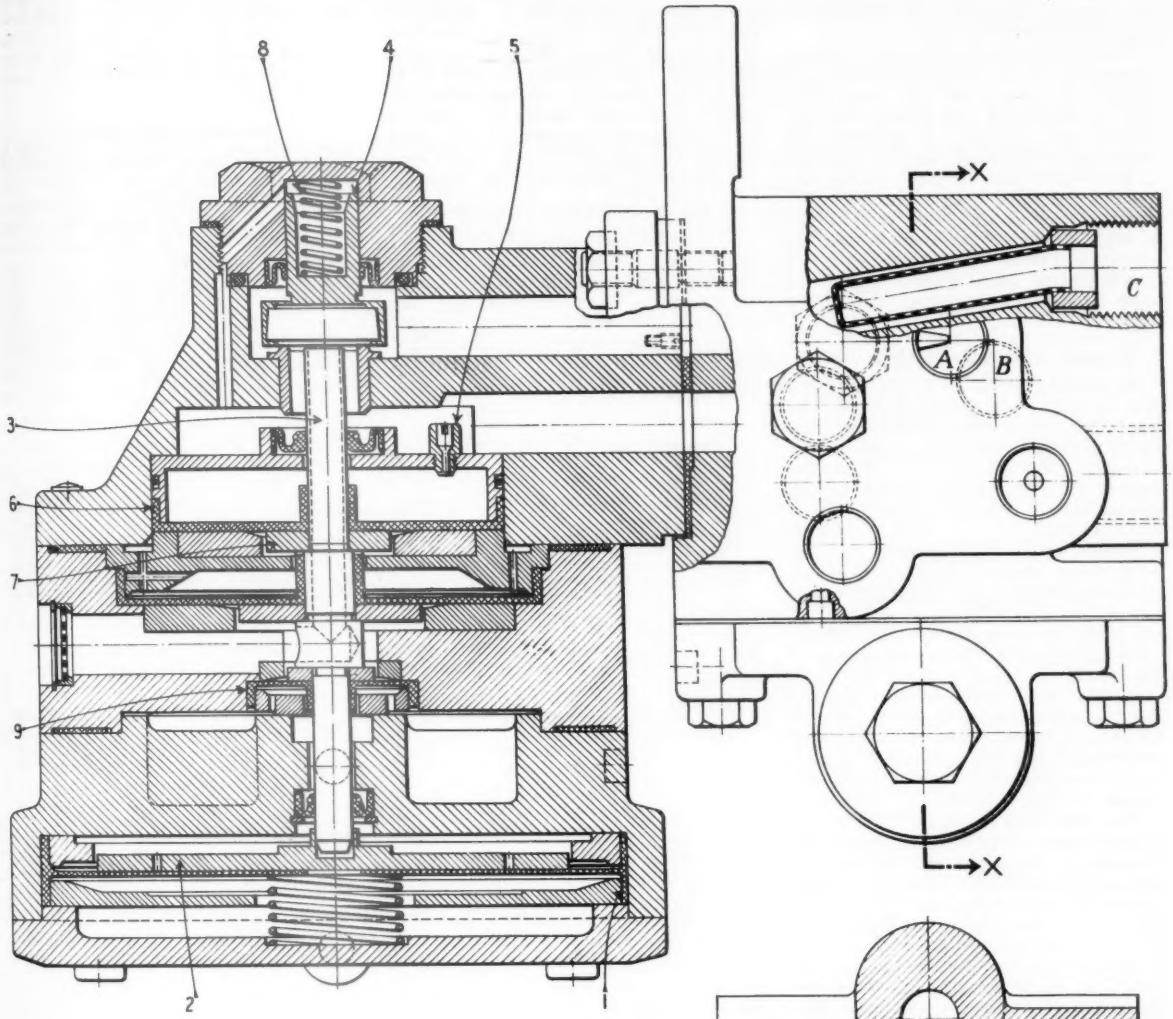


Fig. 3—Cross-section of Metcalfe-Oerlikon type F.D.1 driver's air brake valve



1 Control ring diaphragm
2 Control pressure plate
3 Control valve spindle
4 Inlet valve stem
5 Equalisation choke
6 High pressure diaphragm
7 High pressure plate
8 Inlet valve spring
9 Anti-slip diaphragm

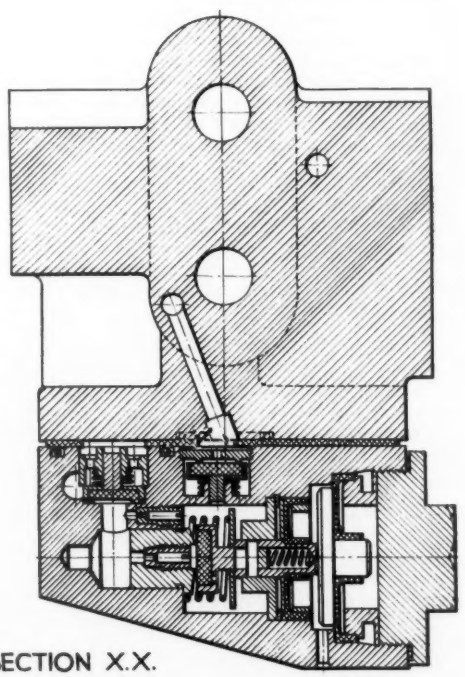


Fig. 4—(Above) Construction of Metcalfe-Oerlikon locomotive triple valve type LSt. 2 featuring rubber diaphragm-operated valves (Right) Section through triple valve showing valve assembly controlling "braked/unbraked" changeover mechanism

removed from the face side of the panel for cleaning or servicing without breaking any pipe connections.

The self-sealing diaphragm 3 is fully supported on the upper face and by the diaphragm seat 6 on the lower face. The spring loaded inlet valve 5 is a hard rubber disc carried in a stainless steel stem, the valve sealing against a seating 7 which gives line contact. In the inlet part of the valve body is fitted a cylindrical gauze strainer 8. For normal operation the removable handle as shown is fitted. Alternative types are available for cam operation and for dual operation from either side of the cab.

Vacuum Controlled Triple Valve

In the case of an air braked locomotive hauling vacuum braked trains, the air brakes are automatically controlled from the driver's vacuum brake valve by means of a triple valve. This valve applies or releases the air brakes in sympathy with the fall or rise in train pipe vacuum.

Reference to Fig. 4 shows that the same basic Metcalfe-Oerlikon features of rubber diaphragm operated valves, as used on the driver's air brake, are the main elements of the triple valve.

In addition to the primary function of automatic air brake control the triple valve can also incorporate components for braked/unbraked control, anti-slip brake, and engine brake release. These components are self-contained assemblies which may be added to existing equipment as required.

The train vacuum pipe connection *B* communicates through chokes with the chamber on the lower side of the diaphragm 1. Since this chamber is also connected to the expansion reservoir by pipe connection *D*, the train pipe can also draw air from this reservoir. The diaphragm has a hole in the centre, and there are also holes in the control pressure plate 2 so that the upper chamber may also be evacuated. Drilled passages communicate with connection *A* to which the control reservoir is coupled. Thus the chamber on the upper side of the diaphragm and the reservoir will be evacuated to the initial train pipe vacuum. Air from the locomotive main reservoir feeds to connection *C*, and the connection *E* leads to the brake cylinders.

Valve Operation: Braking

An application of the driver's vacuum brake valve reduces the train pipe vacuum. Air also flows via connection *A* and the chokes in the valve body into the chamber below the control pressure diaphragm 1.

Vacuum in the upper chamber and in the control reservoir is retained by the seating made between the diaphragm and the lower surface of the control pressure plate. The effect of the above is to cause the valve spindle 3 to lift the inlet valve 4 and admit air to the brake cylinders.

At the same time as pressure in the brake cylinder rises, air will flow through the choke 5 and exert a downward pressure on the high pressure diaphragm 6 and plate 7. At a predetermined figure in relation to the drop in train pipe vacuum, this pressure overcomes the force holding the inlet valve open, and the valve closes under the action of the valve spring 8. Thus for each change in pressure in the locomotive vacuum train pipe there is a corresponding brake cylinder pressure.

Valve Operation: Releasing

During releasing stages the train pipe vacuum is increased and the pressure on the lower surface of the control pressure diaphragm 1 is correspondingly decreased. The brake cylinder pressure acting on the diaphragm 6 causes the control valve spindle to move downwards away from the inlet valve, thus releasing the brake pressure to atmosphere through the hollow valve spindle. The valve closes when the air brakes have been released to a degree determined by the extent of the vacuum brake release.

Braked/Unbraked Attachment

To ensure that the locomotive braking is in accordance with requirements when operating either braked or unbraked trains, this attachment is fitted to the triple valve and operated by an electro-pneumatic valve. This E.P. valve diverts the air flow to the brake cylinders through a single choke which reduces the rate of filling. In the cab is fitted a two-position switch which is set by the driver in the braked or unbraked position according to the class of stock being hauled. The switch which energises the solenoid in the E.P. valve is incorporated in the driver's vacuum brake valve.

The valve assembly for this attachment is shown in section XX. It will be seen that two chokes are fitted, one of which can be closed by a diaphragm-operated valve. For "unbraked" working this valve remains closed, and all the air supply to the filling valve (on the left) passes through the upper choke, thus giving the required delayed action. For the higher speed braking of fitted stock, the lower choke valve is opened, and the air supply is then through both chokes.

Anti-Slip Attachment

A technique now used when starting to prevent wheel slip on gradients is the automatic application of approximately 10 lb. pressure (according to the type of locomotive) in the brake cylinders. For this operation a driver controlled push button operated E.P. valve is used to admit air pressure for the operation of the control diaphragm 9 on the triple valve spindle. On some applications the use of this device is preferred to sanding.

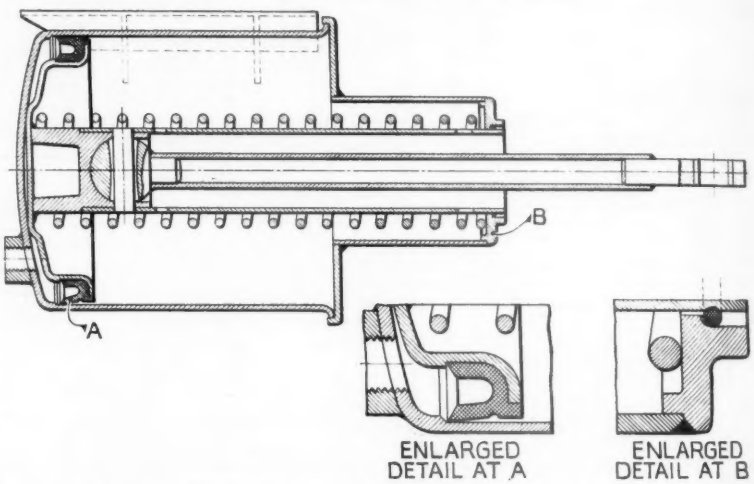


Fig. 5—Section and enlarged details of type SB air brake cylinder, typical of the range in production

This feature enables the locomotive brakes to be completely or partially released as required independently of the train brakes. The release is controlled by an electro-vacuum valve which when operated gives a communication between the control reservoir and the locomotive vacuum train pipe. The valve is operated by a push button on the driver's desk.

Air Brake Cylinder

In addition to its range of control valves, Davies & Metcalfe also manufactures a range of air brake cylinders from 6 to 14 in. dia. (Fig. 5). These are of patented lightweight construction and incorporate several interesting features. The cylinder is a solid drawn steel pressing with a stiffening flange at the open end. Clearance volume is reduced to a minimum by the forming of a dished end in the cylinder. The mounting brackets, end cover lugs, and air pipe boss are welded to the cylinder. The end cover, which is retained by two bolts, carries a tubular extension which forms a support for the piston guide-tube, and a housing for the return spring. The

(*Continued on page* 104)

Type "2" Diesel-Electric Locomotives for British Railways

Derby Works-built 1,160-*h.p.* 75-*ton units with B.T.H.-Sulzer power equipment*

THE first of a series of 1,160-h.p. diesel-electric locomotives fitted with Sulzer engines and British Thomson-Houston electrical equipment has been completed for service on British Railways. A total of 30 such locomotives, Nos. D5000-D5029, are now under construction at Derby, of which 15 are to go into service on the Southern Region, five on the London Midland Region, and 10 on the Eastern Region. They are of Bo-Bo wheel arrangement and weigh 75 tons in working order.

Leading particulars are as follows:—

Length over buffers	50 ft. 6 in.
Bogie centres	28 ft.
Bogie wheelbase	8 ft. 6 in.
Wheel dia.	3 ft. 9 in.
Fuel capacity (engine and boiler)	630 gal.
Boiler water capacity	600 gal.
Weight in working order	75 tons
Maximum axleload	18¾ tons
Maximum tractive effort	40,000 lb.
Continuous tractive effort	21,300 lb. at 15 m.p.h.
Maximum designed speed	75 m.p.h.

These locomotives are equipped to work in multiple with others of the same design, and with other British Railways diesel-electric locomotives with B.T.H., Crompton Parkinson and Engish Electric electrical equipment.

Construction

The underframe consists of two longitudinals, each comprising two standard channel sections placed back to back, the intervening space being enclosed top and bottom to form air ducts for ventilation and traction motor cooling. The longitudinals form the foundation for the four-point mounting of the engine-generator set, and are tied together by two main transoms carrying the bogie centre pivots and by other members, all of double-channel section. The side girder frames are welded to these transoms and are tied together at the top by the roof frames. Oleo hydraulic-pneumatic buffers are fitted, and provision has been made for the substitution at some future date of the normal drawhook by an automatic central coupler.

The superstructure is designed with a driving cab at each end; the power unit and control compartment, and the train-heating boiler compartment are between the driving cabs, and there are communicating doors between each. Side covers and roof hatches are provided to give access to major units. Air filters are fitted in the body side panels to ensure clean air in the engine-generator compartment. Special care has been taken in sealing all possible sources of leakage of unfiltered air into the compartment.

With a view to achieve a light construction, some components have been constructed in aluminium alloy: these include driving cabs, with floor and floor supports, roof hatches, radiator fan housing and ducting, cab and gangway doors, air louvres in housing sides, and main floor plates. In addition the roof of each cab is moulded in reinforced polyester resin. The complete locomotive, including cabs, is lined with Fibreglass Navy Board, thicknesses varying from ¾ in. to 2 in. on either side of the cab bulkheads. A silencer of large volume is fitted, comprising separate expansion and resonator chambers which are well lagged to prevent heat radiation.

The two doors are situated in the cab sides behind the driver's and assistant's seats. Cab heating and ventilation, combined with a screen de-mister, is fitted. Fresh air is blown through heating elements fed from the engine cooling system and is controlled by the driver. The unit can be used for blowing cool air in exceptionally hot weather. Screen wipers are provided, and also a two-tone warning horn. An electric cooker is provided in each cab.

The seats are adjustable and controls and indicators are arranged conveniently, instrumentation having been kept to a minimum.

A wheel slip and engine failure warning lights are provided, together with boiler and power equipment fault lights. A detailed indicator in the engine compartment shows which part of apparatus is giving trouble.

Bogies

The bogies are of welded and riveted construction, with box frames, and are of the spring bolster type. Primary suspension consists of two sets of coil springs arranged on each equalising beam and damped by hydraulic shock absorbers. The bolster rests on the spring plank through two nests of coil springs, the motion of which is also damped by shock absorbers. The spring plank is suspended by four swing links pin-jointed with hardened steel bushes at the top and knife-edged at the bottom connection to the spring plank.

Bogies of the first 10 locomotives are to be fitted with SKF roller-bearing axleboxes; those on the second series of 10 are to have Athermos boxes. Brake equipment is of the Oerlikon type, with Westinghouse brake cylinders. A straight air brake is provided for the locomotive and operated through the driver's straight air brake valve in the

First of 30 1,160-*h.p. diesel-electric locomotives built at Derby Works, London Midland Region*

cabs. An automatic vacuum system is provided for the operation of the train brake. A brake cubicle is provided in which the majority of the brake valves are contained, in order to facilitate maintenance and ensure cleanliness.

Four 8-in. horizontal brake cylinders, each incorporating a slack adjuster, are mounted on one bogie. Air for the locomotive brakes and for the air-operated control equipment is provided by a Westinghouse DVC.2 compressor. Vacuum for the train is provided by two Westinghouse 4V 110-G exhausters.

Anti-Slip Brake

Besides conventional sanding, the anti-slip brake has been introduced to this country on this design. The device consists of two relays, which are fitted singly between the two motors of each bogie, and any variation in speed of the motors creates a voltage differential which causes the indicator light in the cab to glow brightly. When this occurs, the driver eases off the power control lever and presses the anti-slip button, which gives a slight brake application through the medium of an electrical impulse to the diaphragm of the air brake valve. Dimming of the indicator light occurs when the slip has been controlled and the power lever may then be opened up. Separate operating switches are provided for the anti-slip brake and for sanding.

Power Equipment

The engine is a Sulzer 6LDA.28, pressure-charged six-cylinder four-stroke in-line engine rated at 1,160 b.h.p. at 750 r.p.m. Five of the engines are being supplied from the Sulzer works in Switzerland, the remaining 25 by the Vickers-Armstrong works at Barrow to the order of Sulzer Bros. (London) Ltd.

The engine cooling is a complete by-pass system incorporating self-draining radiators and serves the double purpose of giving full automatic temperature control together with complete frost protection at all times. It incorporates a servo-operated thermostatic bye-pass together with four-position control whereby the radiator is progressively brought into operation and the radiator fan speed is progressively increased.

The generator unit comprises three machines: a main generator, an auxiliary generator, and a differential exciter. The main generator is a single bearing, 12-pole, separately-excited and self-ventilated machine. It is of 735-kW. output rated at 750/525 V., 980/1,400 A., 750 r.p.m. The auxiliary generator is an eight-pole separately-excited constant-voltage machine at 32/50 kW., 110 V. 325/750 r.p.m., and its armature is mounted on an extension of the shaft of the main generator.

The four traction motors are B.T.H. type 137BY, four-pole force-ventilated, with a continuous rating of 213 h.p., 525 volts, 350 amp., and with a one-hour rating of 209 h.p., 490 V., 375 A. They are nose-suspended motors, each driving one axle through single-reduction gearing. They are force-ventilated by two blowers driven by one 12·2-h.p. motor; each blower serves a pair of traction motors.

The motors are axle-hung and nose-suspended by Metalastik chevron rubber units, which provide a soft vertical suspension and effect a large measure of lateral control of the motor irrespective of side movement of the axle, thus reducing tyre flange wear and improving riding of the locomotive. The gear wheels are of resilient construction and consist of a hub and toothed rim connected through rubber bushes which cushion mechanical shocks due to accelerating forces and track irregularities.

Control Equipment

Complete control of the main traction equipment is obtained by a self-lapping air valve operated from the master controller. On moving the power handle away from the "O" position, the load regulator first runs up, increasing the excitation and therefore tractive effort. At a certain point, the main engine characteristic is reached and thereafter engine speed and power rise together, until the full rated horsepower is reached. This control is achieved without the use of "notching" contractors.

Maximum tractive effort is reached at a low engine speed so that racing the engine to start the train is unnecessary. Field weakening is introduced in stages initiated by the generator load regulator. The traction motors are arranged in permanent parallel across the main generator and there are two stages of field weakening. The control gear is mounted in a cubicle near the main generator and includes pneumatic contractors for the four traction motors and electro-magnetic contractors for engine starting and motor field weakening.

The battery is contained in four pull-out boxes suspended from the underframe.

Train heating steam is provided by a Stone-Vapor boiler having a capacity of 1,500 lb. per hr. at 60 lb. per sq. in. The apparatus is automatic and fully protected. The T.I.A. system of boiler feed water treatment is provided incorporating a hydrostatic doser tank.

These locomotives have been designed to the requirements of the British Transport Commission under the general direction of Messrs. R. C. Bond, Chief Mechanical Engineer, and S. B. Warden, Chief Electrical Engineer, British Railways Central Staff, B.T.C. The detailed design and supervision of construction is the responsibility of Mr. J. F. Harrison, Chief Mechanical & Electrical Engineer, Derby, London Midland Region. The whole design has been co-ordinated with the British Thomson-Houston Co. Ltd., which is the main contractor for the power equipment, and with Sulzer Bros. (London) Ltd., the diesel manufacturer.

Sub-contractors for the locomotives include:—

Brake equipment ..	Davies & Metcalfe Limited
Aluminium alloy plates and sections	Imperial Chemical Industries Limited
Pipe couplings ..	British Ermeto Corporation Limited
Fuel capacity gauges and instruments	Smiths Industrial Instruments Limited
Rubber glazing strips	Howard Clayton-Wright Limited
Filters	Zwicky Limited
Train heating equipment	J. Stone & Co. (Deptford) Ltd.
Warning horns ..	Desilux Equipment Company
Athermos axleboxes	Robert Hyde & Sons Ltd.
Roller bearing axleboxes	Skefko Ball Bearing Co. Ltd.
Bogie shock absorbers	James Woodhead & Sons Ltd. Armstrong Patents Co. Ltd.
Brake cylinders, compressors and exhausters	Westinghouse Brake & Signal Co. Ltd.
Welded-on studs ..	Crompton Parkinson (Stud Welding) Limited
Treadmaster floor covering	James Walker & Co. Ltd.
Fire protection equipment	Pyrene Co. Ltd.
Windows	Beckett, Laycock & Watkinson Limited
Oil retaining bushes ..	Bound Brook Limited
Universal shafts and joints	Hardy Spicer Limited
Window wipers ..	Trico-Folberth Limited
Sound insulation ..	Fibreglass Limited
Spire nut grips ..	Simmonds Aerocessories Limited
Door locks and handles	James Beresford & Sons Ltd.
Mills drive pins ..	James Mills Limited
Locks and catches ..	Wilmot Breedon Limited
Buffers	Oleo Pneumatics Limited
Seats	A. W. Chapman Limited
Footstep treads ..	Ferodo Limited
Self-sealing hose couplings	Automotive Products Co. Ltd

Braking Control Equipment

(*Concluded from page* 102)

unrestricted space available for the spring enables this to be made of sufficient strength to render unnecessary any pull-off springs in the linkage.

Fitted on the piston guide tube is a spring circlip which, by limiting the free extension of the spring, removes all spring load from the two cover bolts. This permits the ready withdrawal of the end cover, complete with piston and spring, for cylinder and seal inspection and cleaning. The spherical ball-end and seat for the piston rod is arranged to ensure a direct thrust on the linkage.

In the design of the piston seal, special provision has been made for adequate cylinder lubrication, and it is claimed that a seal life exceeding five years is normal for this design. The synthetic-rubber cup-shaped seal is sprung into a shallow groove on the outside of the piston and no separate retaining ring or fixing is required. From the leading edge the outside diameter is tapered to provide a clearance on the non-pressure side and further clearance is provided by a groove in the seal. When the seal is under pressure it expands against the cylinder, filling the clearance space and spreading the grease in the groove over the seal. The action of the seal contracting when the pressure is released on the return stroke, draws grease into the clearance and into the seal groove. This ensures that the cylinder is wiped with grease on each outward stroke of the piston. The cylinders, which vary in weight from 50 lb. to 110 lb., can be arranged for vertical or horizontal mounting.

In the cycle testing of the Metcalfe/Oerlikon equipment close attention is given to fault simulation on the test rigs, in order to prove reliability under extreme service conditions.

RAILWAY NEWS SECTION

PERSONAL

Mr. B. Arora, who, as recorded in our June 6 issue, has retired as General Manager of the North Eastern Railway of India, has been appointed General Manager of the Central Railway of India. He succeeds Mr. M. N. Chakravati, who has been appointed Member (Staff) of the Railway Board, on the retirement of Mr. K. P. Mushran.

Sir J. Landale Train

Full-time Member, British Transport Commission, 1953-58

Mr. J. Ratter

Appointed a full-time Member of the British Transport Commission

Sir J. Landale Train, C.B.E., M.C., M.I.C.E., who, as recorded in our July 7 issue, is to retire on September 30, as a full-time Member of the British Transport Commission, began his career with the North British Railway as an apprentice in 1908 and became Junior Engineering Assistant, Great Northern Railway, in 1912. He enlisted in the Infantry in August, 1914, was awarded the M.C. in 1918 while in command of a Field Company R.E., and was demobilised with the rank of Major in June, 1919. Sir Landale Train was appointed Personal Assistant to the Chief Engineer, G.N.R., in 1921. In this capacity he was responsible for introducing to this country the Hallade track recorder and Hallade method of adjusting curves. Three years later he was appointed Assistant Industrial Agent in the Chief General Manager's office, and was placed in charge of the Works Section of that office in 1925. In 1927 he became Assistant to the Chief General Manager (Works), and, two years later, was transferred to Glasgow as District Engineer (Western Section), Southern Scottish Area. In 1934 he was appointed Assistant Engineer (Maintenance), Southern Area, and became Assistant Engineer of that area in 1937. He was appointed Engineer, Scottish Area, in October, 1938, and, in 1941, Engineer, Southern Area. In 1942 he became Chief Engineer. Sir Landale Train served on the Railway (London Plan) Committee between 1946 and 1947. He was appointed a full-time member of the Railway Executive in 1947, and a full-time Member of the British Transport Commission in 1953. He has been a Member of Council of the Institution of Civil Engineers and Past President of the Permanent Way Institution. He was awarded the C.B.E. in 1952, and was appointed a Knight Bachelor in the New Year Honours List of 1957.

Mr. E. W. Arkle, Director of Traffic Services, London Midland Region, British Railways, and Mr. A. W. Tait, Assistant General Manager, Eastern Region, British Railways, have been appointed to the board of the Atlantic Steam Navigation Co. Ltd. (which operates The Transport Ferry Service), and of its subsidiary, Frank Bustard & Sons Ltd.

Mr. R. A. Long, Principal Traffic Costing Officer, Eastern Region, British Railways, has been appointed Economic Survey Officer (Eastern Region).

Mr. J. Ratter, C.B.E., B.Sc., M.Inst.C.E., Technical Adviser to the British Transport Commission, who, as recorded in our July 4 issue, has been appointed a full-time Member of the Commission, was educated at St. Peter's School, York, and at Durham University. He began his railway career in 1929, as a pupil of the late Mr. John Miller, then Engineer, North Eastern Area, L.N.E.R., and, after holding several appointments with that company, joined the L.P.T.B. in 1936 as an assistant in the Permanent Way Department. In 1938, he returned to the L.N.E.R. as Assistant District Engineer, Sheffield. Mr. Ratter served throughout the war with the Royal Engineers in France, Africa, and Italy, also in the War Office. He became Deputy Director of Transportation, C.M.F., with the rank of Colonel, and with the responsibility for railway reconstruction in the Italian campaign. He was mentioned in despatches in 1942, awarded the O.B.E. and Legion of Merit (U.S.A.) in 1944 and C.B.E. in 1945. On demobilisation he rejoined the L.N.E.R. and was appointed District Engineer, Guide Bridge. In 1946 he became Permanent Way Assistant to the Engineer, Kings Cross. Mr. Ratter joined th L.P.T.B. in 1947 as Civil Engineer (Maintenance), with responsibility for maintenance of all railway and tram permanent way, and all rail and road service properties of the Board. He was appointed Chief Officer, Engineering

(Works), Railway Executive Headquarters in 1951, and, in October, 1953, under the interim railway reorganisation following the Transport Act, 1953, he became Chief Officer (Civil Engineering), British Transport Commission. From that time, until he was appointed Technical Adviser to the Commission in 1954, Mr. Ratter was Chairman of the Civil Engineering Committee.

Colonel N. McK. Jesper, D.S.O., O.B.E., M.C., E.R.D., who, as recorded in our May 30 issue, is retiring as Chief Police Officer, British Transport Commission, comes from a railway family, and is a twin son of the late Charles Jesper, General Goods Manager, North Eastern Railway, who died in 1900. He was educated at Oundle and joined the former North Eastern Railway, as a traffic apprentice, in 1914. Throughout the 1914-18 was he served in the Grenadier Guards, was wounded twice and awarded the M.C. He returned to railway service in 1919, and became the first traffic apprentice to be included for training with the Locomotive Department. Colonel Jesper subsequently held positions in the Operating Department at Shildon, Darlington, and Sunderland, and, at the outbreak of the 1939-45 war, was Staiths Superintendent at Dunston-on-Tyne. He had joined the Supplementary Reserve in 1925, and when called up in 1939, was Second in Command to the Director of Docks. He served in France, Northern Ireland, Greece, Egypt, the Middle East, the Sudan, and West and North Africa, and was in the three evacuations, being awarded the D.S.O. for Dunkirk and the O.B.E. for Greece. On his return in 1945, he was appointed Chief of Police, L.N.E.R. (Southern Area) and on nationalisation became the first Chief of British Transport Commission Police (London Area). He was appointed Chief Police Officer, B.T.C., in December, 1956.

Colonel N. McK. Jesper
Chief Police Officer, B.T.C., 1956-58

Mr. A. C. West
Appointed Chief Constable, B.T.C.

Mr. J. F. Harrison, Chief Mechanical & Electrical Engineer, London Midland Region, British Railways, has assumed new responsibilities for the overall direction of all the mechanical and electrical engineering work of the region, including the Chief Mechanical & Electrical Engineer's Department and the Carriage & Wagon Engineer's Department, as well as the technical aspects of Motive Power and Road Motor Engineer Departments. Mr. Harrison is to make his headquarters at Euston.

Mr. F. A. Pope has been appointed a Director of the Metropolitan-Cammell Carriage & Wagon Co. Ltd. Mr. J. G. James, Commercial Manager, and Mr. W. Scott, Chief Accountant, have been appointed Special Directors.

Mr. D. L. Munby has been appointed, for seven years, to the Readership in Economics & Organisation of Transport by the Electors of Oxford University.

Under the Law of Ministries recently sanctioned by the Argentinian Congress the constitutional eight ministries have been confirmed and 12 secretariats formed. Each of these is dependent on one of the ministries. The Ministry of Transport has not been re-established but its function has been assumed by one of the three secretariats attached to the former Ministry of Public Works, now the Ministry of Public Works & Services. The three secretariats are those of Public Works, Communications, and Transport. Dr. Alberto J. Lopez Abuin has been confirmed as Transport Secretary, and Dr. Ricardo Ernesto Agostini has been named Under-Secretary for Transport.

Mr. A. C. West, O.B.E., Chief Constable of Portsmouth, who, as recorded in our May 23 issue, has been appointed Chief Constable, British Transport Police, joined the Hampshire County Constabulary in 1921. After serving in all ranks, he became County Divisional Superintendent in 1937 and was appointed Chief Constable of Portsmouth in 1940. He has been Hon. Secretary, Association of Chief Police Officers of England & Wales since 1947. Mr. West is a member of the Police Council of Great Britain; the Home Office Police War Duties Committee; the Central Conference of Chief Constables of England & Wales; the Ministry of Transport Road Safety Committee, and the Public Relations Committee of the International Association of Chief Police Officers of the U.S.A. He is also Police Adviser to the Civil Defence Committee of the Association of Municipal Corporations; Vice President of the Portsmouth Accident Prevention Council, and Chairman of the Gurney Police Widows and Orphans

Mr. W. R. Stevens

Appointed Traffic Manager, Cardiff, Western Region, British Railways

Fund. Mr. West holds the Queen's Police Medal and the Order of St. John of Jerusalem, serving on the St. John Ambulance Council for Hampshire. The appointment is part of the changes in organisation of the B.T.C. Police Force, referred to editorially and in the personal columns of our February 14 issue.

Mr. W. R. Stevens, M.Inst.T., South Wales Area Officer, Western Region, British Railways, who, as recorded in our June 27 issue, has been appointed Divisional Traffic Manager, Cardiff, was educated at Clifton College. He joined the former Great Western Railway in the General Manager's Office, Paddington, in December, 1919, and was transferred to the Office of the Superintendent of the Line, Paddington, in 1932. He was appointed Junior Assistant to the Divisional Superintendent, Paddington, in 1933, and Chief Clerk to the Divisional Superintendent, Gloucester, in 1935. He became Assistant Divisional Superintendent, Newport, in 1939, and was appointed Divisional Superintendent in June, 1946. In 1956, Mr. Stevens became South Wales Area Officer, Cardiff. In his new appointment he will co-ordinate and control all commercial and operating functions in South Wales. Under the revised organisation, he will be responsible to the Assistant General Manager (Traffic). Mr. Stevens was President of the Newport and Monmouthshire Chamber of Commerce in 1953.

Mr. R. F. J. Surry, Passenger Assistant to the Chief Commercial Manager, Southern Region, British Railways, has retired. Mr. Surry commenced his railway career in 1913 in the Central District Superintendent's Office at Eastleigh, London & South Western Railway. After holding several appointments in the offices of the Chief Operating Superintendent and the Traffic Manager, Southern Railway, he became that Railway's representative in the New York Office in 1931. On his return to this country, he was appointed Assistant to the London Central District Superintendent, later taking up a similar appointment in the London East District. In 1938 he became Assistant District Superintendent, London West and, in 1948, Development Assistant to the Commercial Superintendent. Mr. Surry was appointed Passenger Assistant to the Chief Commercial Manager in 1954.

Mr. John Collins, Generating Station Superintendent, Lots Road Generating Station, London Transport Executive, has retired after more than 36 years' railway service.

Mr. D. A. Strickland has been appointed Ocean Travel Manager of Thos. Cook & Son Ltd.; he succeeds Mr. C. M. Squarey, who relinquished the position on July 1 to become General Manager of Ocean Travel Development Limited, a newly-formed shipping owners' organisation. Mr. J. E. Shepherd succeeds Mr. Strickland as Assistant Traffic Manager, Mr. L. F. Olney becomes Assistant Traffic Manager (Agents), and Mr. J. W. P. Phillips, Branch Manager, Gracechurch Street, succeeds Mr. Olney as Controller, Home Counties & Ireland Area.

Mr. D. L. Irwin, Snr., has retired as Managing Director of the Ruberoid Co. Ltd.; he is succeeded by Mr. D. L. Irwin, Jnr., and Mr. G. D. L. Goslett as joint Managing Directors. Mr. Irwin, Snr., remains on the board as Consultant Director & Chairman. Sir Richard Yeabsley has been appointed Deputy Chairman.

Mr. W. R. Walton, District Manager North Western Area, Sulzer Bros. (London) Limited, will relinquish his appointment on July 31 to undertake special duties on research and development at the Leeds factory. His successor will be Mr. J. H. Rutter, who until recently has been the company's representative in Malaya.

Mr. R. J. Barritt, Managing Director of the Indian Steelworks Construction Co. Ltd., is resigning on September 1, in order to return to company work, but he will be available to the board for consultation. Mr. W. S. Hindson, Chief Engineer, has been appointed to succeed Mr. Barritt.

Mr. L. Dobson has been appointed Engineering Director of the Plastics Division, Imperial Chemical Industries Limited. Before joining the Plastics Division at the beginning of this year, Mr. Dobson was Polythene Director of the Alkali Division.

Mr. John Drabble, Editor of the *Board of Trade Journal*, has retired; he has been succeeded by Mr. James E. Holroyd, the Board's Chief Press Officer. Miss M. I. Lee has been appointed Chief Press Officer.

Sir Henry Spurrier, Chairman & Managing Director of Leyland Motors Limited, has been elected Chairman of the British Transport Vehicle Manufacturers Association for the ensuing year.

Sir Alexander Sim has been appointed a Director & Chairman of Henley Foundries Limited, a subsidiary of W. T. Henley's Telegraph Works Co. Ltd. He succeeds Sir John Dalton, who has retired.

Mr. J. S. Canning has been appointed to the board of Ransomes Sims & Jefferies Limited as a non-executive director. He has been General Sales Manager since 1955.

Mr. W. W. MacArthur, Works Director, Craven Bros. (Manchester) Limited, has retired from full-time business activity and has resigned from the board.

Mr. C. N. MacKay

Appointed Assistant (Public Relations) to the General Manager, Scottish Region

Mr. Colin Neil MacKay who, as recorded in our July 18 issue, has been appointed Assistant (Public Relations) to the General Manager, Scottish Region, British Railways, left an honours course at Glasgow university, where he was reading English language and literature, to take up an appointment with the Scottish *Daily Express*. During the war he served with the Royal Air Force as a Controller of Operations and later as Public Relations Officer. Mr. MacKay, who had been a regular broadcaster for many years, joined the News Division of the B.B.C. in Scotland in 1951. He has had a wide experience in the presentation of programmes on the B.B.C. and covered most of the Royal visits to Scotland, taking the place of the B.B.C. London Court Correspondent, travelling in the Royal entourage. Mr. MacKay was Honorary Secretary and Treasurer of the Scottish Commando Benevolent Fund and served on the Committees of many charitable organisations including Friends of France, King Georges Fund for Sailors and Queen's Nurses Pension Appeal.

Dr. C. J. Dadswell, a Director of the English Steel Corporation Limited, has been elected Chairman of the British Steel Founders' Association. He succeeds Mr. G. M. Menzies, Chairman of the North British Steel Foundry Limited.

Mr. Robert W. Asquith, Chairman of Asquith Machine Tool Corporation, has been appointed Chairman of the Economic Policy Committee of the Machine Tool Trades Association.

The Earl of Halsbury will retire as Managing Director of the National Research Development Corporation on March 31, 1959, to take up another appointment.

Mr. C. S. Martin has been appointed Manager of the North-western Division of Shell-Mex and B.P. Limited, in succession to Mr. J. C. Porritt, who retired recently.

Mr. L. Johnson, Development Engineer, W. H. Dorman & Co. Ltd., is on an extensive business tour of the Middle East.

NEW EQUIPMENT AND PROCESSES

Cable Reel Jack

AN extension to the range of Duff-Norton ratchet lowering jacks has been introduced; this is a special model for handling cable drums.

In construction and operation the model follows the main features of the existing range but includes three specially shaped lugs as hooks for accommodating the drum spindles at heights of 8, 16 and 24 in. from the ground. Duff-Norton jacks use the familiar lever and fulcrum principle to lift and lower the load. The downward stroke of a lever, acting through a short pawl, raises a hardened steel, square, notched bar or rack by one lift. A long pawl then slips into place to hold the load whilst the lever is being raised to engage a further notch. Controlled ratchet lowering is effected by reversing the mechanism. Advantages of this construction, apart from lower cost and maintenance, are claimed to be faster operation and an easily handled unit.

The cable drum unit, whilst of particular application to straight cable laying operations, will also meet a need for a simple device in industry where cable drums of many kinds are handled, such as in the servicing of haulage ropes, hoists, winding gear and mooring cables.

Specifications of the cable reel unit include a weight of 66 lb. and a maximum working load of 5 tons per jack. The hooks will accommodate 2-in. dia. spindles and the wooden base plate used measures 2 ft. × 9 in. × 2 in. There is complete interchangeability of all internal parts with the 5-ton model in the range for general lifting work.

The cable drum unit is manufactured by the Consolidated Pneumatic Tool Co. Ltd., 232, Dawes Road, London, S.W.6.

Straddle Carrier

THE British Straddle Carrier Mark 2, demonstrated recently, is stated to be the first vehicle of its type to comply with Ministry of Transport requirements which permit its use on public roads in this country. Straddle carriers find application at docks where they can be used for the rapid clearance of timber and other long loads from alongside a discharging vessel. They can also be used, in workshops to handle boilers, tanks, machines and so on.

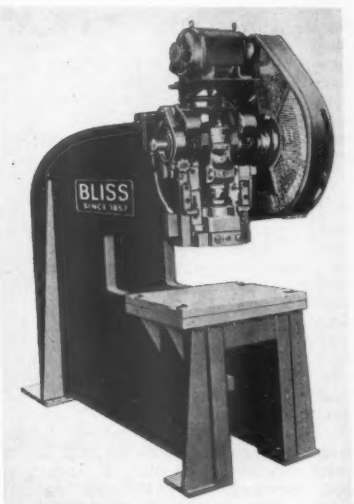
The speed of collection and removal makes it possible to maintain storage depots some distance from the plant itself, if necessary on inexpensive, unmade ground. The system can also be effectively co-ordinated with the fork-lift trucks and unit load system. Loads of about 5,000 lb. can be built up by truck into pallet loads of up to 20,000 lb. for transport by straddle carrier. Drums containing oil or other liquids are particularly suitable for handling by this method; with special pallets, 24 drums of 40 gal. each can be carried in one load. The maximum load of 20,000 lb. can be transported at 12 m.p.h.; carrying 14,000 lb., the carrier can travel at 30 m.p.h.

The hooks clamp and lift hydraulically, aligning themselves automatically with the load. A relief valve provides overload protection. The machine is fitted with a Marles integral power-assisted steering unit. The geometry of the steering linkage is claimed to reduce tyre wear to a minimum. All four wheels are steerable, giving good manoeuvrability in yards and confined spaces. For use on the highway, where two-wheel steering is mandatory, the rear wheels are locked by a patented device; it is steered by front wheels only.

The engine is a Perkins L.4 industrial type diesel, which gives 62 b.h.p. at 2,000 r.p.m. Six speeds are available in a forward or reverse direction, and all may be selected by one lever. Synthetic rubber oil-resistant hose lines are used throughout the system, giving flexibility which is a particular advantage during servicing, and eliminates fatigue failures sometimes encountered with rigid pipework.

All-round visibility and a full view of the load are obtained from the driving cab; the controls have been evolved following careful design study aimed at achieving maximum operational efficiency.

Further details may be obtained from the manufacturer, British Straddle Carrier Co. Ltd., Newtownards, Co. Down, Northern Ireland.



Deep-Throat Presses

A RANGE of deep throat presses, designed for high speed punching, cutting and forming on large, wide sheets, has been introduced by a manufacturer in the U.S.A. The range includes two bench models of four- and seven-ton capacities and six floor models ranging in capacity from 10 to 60 tons. The machines are built with complete part-interchangeability with bench and inclinable presses of similar tonnages, built by the maker.

Throat depth varies from 12 in. on the smallest bench model to 34 in. on the largest floor model, permitting from 90 to 195 stampings per min. at greater distances from the edge of the sheet.

Some standard features of the presses are fully stress-relieved frames, the Bliss rolling key clutch, extra long gibs to support the slides at all positions and heavy-duty precision forged steel crankshafts. Others include arrangements for continuous or single tripping; crankshaft, backshelf and connection bearings fitted with bronze bushings; standard bolster plates; bar

knockout; metal guards; and vee-belt drive facilities.

The presses are also available with special design features—flanged slides, semi-automatic or automatic lubrication, air friction clutches with push-button controls and spring or air counterbalances for presses with long strokes or flanged slides.

Presses with capacities from 22 to 60 tons can be single-geared or not-geared, and are also offered with an adjustable stroke range.

Further details may be obtained from E. W. Bliss (England) Limited, City Road, Derby.

Unit Terminal Blocks

TWO forms of unit terminal block have been introduced; these are the Kabi U.30 2-B.A., 30-A., and U.60 0-B.A., 60-A blocks.

The U.30 block is moulded in four-way units, and the U.60 in single units, which can be built up as multi-way banks on mild steel bearers. Both blocks are available with or without non-inflammable plastic covers.

Both units are of black phenolic material, the studs and links are in tinned brass, and Ross Courtney type terminals and nuts are fitted.

Full details as to price, and other particulars, may be obtained from the manufacturer, Precision Components (Barnet) Limited, 13, Byng Road, Barnet, Herts.

Oscillating-Head Bench Grinding Machine

THE ease with which a high degree of accuracy can be obtained is stated to be one of the features of the Wickman-Neven type GF/O bench grinding and lapping machine. The oscillating head of this machine enables the tool to be held stationary on the table, while the grinding wheel passes to and fro across the face of the tool.

The uniformity of wheel wear which this method produces prevents the wheel becoming grooved and having to be redressed at frequent intervals. The increase in diamond wheel life due to this factor is claimed to be as high as 30 per cent. Another result of the oscillation is a reduction of tool grinding times. The speed of oscillation is 30 strokes per min., and not only reduces grinding time, but also gives a smoother finish, an accurately flat surface, and reduced operator fatigue. The oscillatory movement can be cut out for grinding curved surfaces such as nose radii.

Oscillation is effected by a f.h.p. motor situated at the rear of the machine. This motor operates through a gearbox and the stroke length is adjustable up to $\frac{5}{8}$ in. either side of the centre line. The main motor is of 1 h.p. and runs at 2,850 r.p.m., at which speed it is free from vibration. High operational accuracy is secured by maintaining the tolerance on the motor flange and spigot within a maximum indicator reading of 0·0005 in.

The base of the machine is a heavy rigid casting which eliminates vibration, and has a simple adjustment and scale for setting a cutting rake accurately. The table has a tenon slot for use of a protractor, an optional extra, so that angles can be accurately set in both planes. Both the table and the specially designed guards have been arranged to take tools of

large section up to $1\frac{1}{4}$ in. square, either right- or left-hand; the coolant pump delivers at the rate of 8 gal. per hr. from a large-capacity tank.

A combined stand and stool cabinet can be supplied if required. This is a single-door cabinet 2 ft. 8 in. high, 2 ft. deep and 1 ft. 7 in. wide.

The machine is stated to be particularly suitable for superfinishing carbide-tipped tools, and a mirror finish (about $\frac{1}{4}$ micro-in.) can be obtained with a superfine cup wheel more quickly than on a normal lapping machine. The accompanying illustration shows the good working area, enabling large tools to be ground.

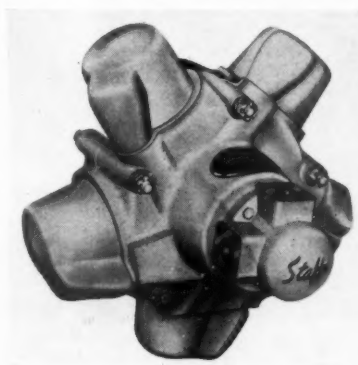
Full details of the machine may be obtained from Impregnated Diamond Products Limited, Tuffley Crescent, Gloucester.

Hydraulic Motor

A HYDRAULIC motor, with the trade name Staffa, has been developed for hydrostatic transmission applications.

It is a slow speed high-torque power unit and when operated by a variable delivery pump can run from 0.50 r.p.m. in either direction and still maintain a constant torque. It is suitable for any application where high torque but slow speed is required such as driving hoists, capstans, mixers and conveyors where variable or constant speeds are desired.

The motor has five radial cylinders, each having a bore of 4 in. with a 3 in. stroke. The connecting rods have slipper type bearings which thrust against the eccentric on the crankshaft. The crankcase is split



in two halves around the periphery which facilitates assembly. One end of the crankcase houses the pintle-type valve which is driven from the crankshaft. Both the valve and crankshaft run in needle roller and taper roller bearings respectively.

The cylinder heads are integral units which are clamped between the two halves of the crankcase and have cast inlet ports feeding the oil to the top of the cylinder. This inlet port also acts as the exhaust port when the piston of the pump is on the return stroke.

Sealing between the various faces of the units is achieved by O-rings; the pistons have cast iron rings. The motor has been designed to work at a pressure of 1,500 lb. per sq. in., and a maximum of 50 r.p.m.

Further details may be obtained from Chamberlain Industries Limited, Staffa Works, Leyton, London, E.10.

All-Metal Couplings

A FLEXIBLE power transmission coupling, with the trade name Metastream, has application to ancillary equipment as used in railway workshops and so on. This all-metal coupling, the Series CN, has all

the advantages of the Metastream system with low cost. The CN coupling is available in sizes which at the moment are limited to a maximum bore size of $1\frac{1}{4}$ in. with a maximum h.p./r.p.m. rating of 0·010.

Transmission membranes can be removed from the coupling without disturbing the driving or driven units and can be replaced cheaply. The couplings are stated to be completely free from corrosion, require no lubrication and employ no rubber bushes, springs, gears, chains or similar devices.

They are unaffected by climatic conditions or operating temperatures, and they are available in single- and double-bank types.

The single-bank range, series S, is available in three sizes, with maximum h.p./r.p.m. ratings of 0·002, 0·005, and 0·01; overall dias. of the couplings are $1\frac{7}{8}$, $3\frac{1}{2}$, and $4\frac{1}{2}$ in., and maximum bores, $\frac{5}{8}$, $1\frac{1}{4}$, and $1\frac{3}{4}$ in. respectively. The double bank, series D, is also available with similar power ratings and dimensions. The accompanying illustration shows a single-bank coupling.

List prices range from 15s. 6d. to £3 13s.; further details may be obtained from the manufacturer, Metaducts Limited, Catherine Wheel Road, Brentford, Middx.

Experimental Transistorised Fluorescent Coach Lighting

Seven first class coaches now running in the five sets of vehicles forming the "Caledonian" express of British Railways, London Midland Region, between Euston and Glasgow Central have been equipped experimentally with fluorescent lighting in the compartments. The lighting operates on the ordinary 24 V. d.c. supply from the coach batteries, and is converted by means of transistor inverters to provide the requisite operating voltage at a high frequency. This is the first time public service vehicles have been fitted with this type of equipment.

Lighting fitting in first class compartment of "Caledonian" express

Trial Design

Sixty complete sets of equipment, each comprising a lighting fitting, transistor inverter and Osram 2-ft. 20-W. warm white fluorescent tube, have been designed and supplied by the General Electric Co. Ltd. The fitting, which at present is a trial design, consists of an anodised aluminium backplate serving as a reflector, on top of which is mounted a case containing the transistor inverter and lamp circuit equipment. Dimensions of the case are approximately 12 in. long by 3½ in. wide by 2½ in. high.

The two transistors are connected in a push-pull circuit with an adequate margin of safety to withstand the maximum peak inverse voltage which may occur. One transistor is mounted externally on each side of the case and in good thermal contact with it, the case metalwork thus acting as a radiator to assist heat dissipation. Windings on the transformer form the oscillatory circuit and provide the feedback to the transistors. The secondary has the usual pre-heating windings and is connected to the tube through a choke. Both transformer and choke are of lightweight construction, the complete inverter unit weighing only about 3 lb.

The equipment has been designed to operate over an input voltage range of 22-32 V. d.c. and to ensure striking of the fluorescent tubes at 0° C.

Development is being undertaken of a similar inverter unit to enable 4-ft. fluorescent tubes to be operated from a 110-V. d.c. input.

B.T.C. Chairman Visits W.R. Engineering Laboratory

During a recent visit to the Civil Engineering Laboratory of British Railways, Western Region, the Chairman of the British Transport Commission, Sir Brian Robertson, inspected the many aspects of testing which this laboratory undertakes and which includes Soil Mechanics work, work in connection with the design and application of cement mixes, and investigations into the stability of long-welded rails and track fastenings using both mechanical and electronic methods.

The illustration below (left) shows the party inspecting a machine designed to simulate the live loading effect from traffic upon a sleeper and its fastenings. The mechanical behaviour of both the sleeper and the fastenings is investigated, also the variation in electrical resistance from rail to rail for track circuiting purposes.

The right-hand illustration shows the party examining soil mechanics sampling and test equipment: (left to right), Messrs. H. Savage, Assistant Civil Engineer (New Works), Western Region; J. M. Waters, Soil Mechanics Assistant; D. L. Bartlett, Head of Civil Engineering Laboratory; Sir Brian Robertson; and Mr. J. R. Hammond, Assistant to the General Manager (Modernisation), Western Region.

Mr. M. G. R. Smith, Chief Civil Engineer, Western Region, and Mr. R. F. Hanks, Chairman of the Western Area Board of the B.T.C., accompanied Sir Brian Robertson on his visit.

Buffet Cars for London-Hastings Diesel Trains

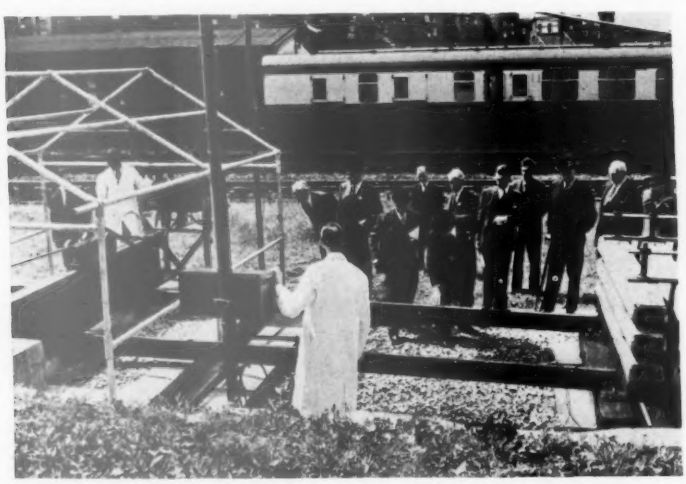
The buffet cars included in the additional six-car diesel-electric sets introduced on the London to Hastings via Tunbridge Wells line on introduction of the summer service each replace a second class open coach. They are of steel construction with the same 8-ft. wide body profile as the other vehicles in these sets, to conform to the restricted loading gauge.

The vehicles are divided into three major parts, a dining saloon at one end, kitchen and staff quarters in the middle and a bar and buffet at the other end of the car. A corridor with a service counter from the kitchen connects the saloon and buffet ends.

The dining saloon, which has accommodation for 17 passengers, is finished in plastic panelling. The kitchen, which has steel-framed walls with aluminium panels and cavities insulated with glass fibre, is fitted with a gas range and hot closet, the floor of the kitchen, the service area of the buffet and the corridor between the saloon compartment and buffet end of the vehicle is covered in chequered aluminium plates, and the floor of the circulating area of the buffet end is covered with black marbled linoleum.

The underframes of the buffet cars are of all-welded construction and are similar to those of standard British Railways design. The full Westinghouse type of electro-pneumatic brake gear is fitted.

The vehicles are mounted on the latest type of electric trailer bogie, which has vibro-insulator auxiliary side bearing springs and rubber-bonded spherical washer swing rod suspension for the bolsters, with horizontal shock absorbers.



Inspecting machine for simulating live loading effect from traffic on a sleeper and fastenings

Examining soil mechanics sampling and test equipment

W.R. Diesel D.800 Run from Plymouth to Paddington

On the occasion of the return journey of the Western Area Board from Plymouth to Paddington, the opportunity was taken of hauling the train by the Swindon-built Type "4" diesel-hydraulic locomotive D.800 *Sir Brian Robertson*. The 2,200-h.p. locomotive was placed in service in the Western Region after a naming ceremony and demonstration run last week, as reported in our last week's issue.

The train in question was the 1.20 p.m. Penzance, 4.10 Plymouth North Road, and details of the actual running times compared with the booked schedule are given below. The driver was W. T. J. Stevenson. The load was 312 tons, tare, from Plymouth, which was increased to 448 tons, tare, from Newton Abbot. The performance is also the subject of editorial comment on page 91 of this issue.

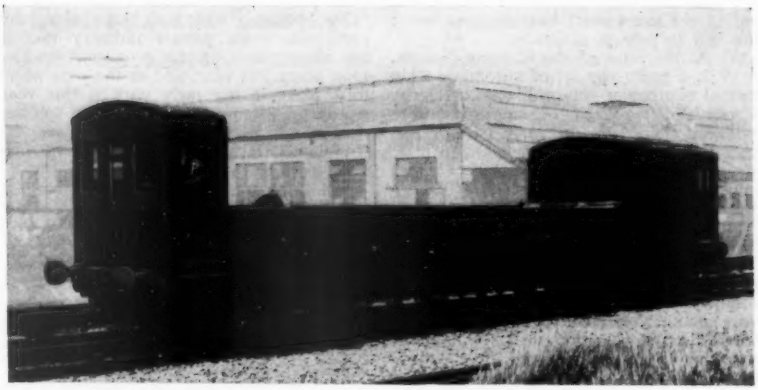
—	Booked times	Actual times	Mins. late or early
	p.m.	p.m.	
Plymouth North Road dep.	4.10	4.10	Time
Lipson Jcn.	4.14	4.14	Time
Hemerdon	4.24½	4.23	1½ early
Brent	4.38	4.35	3 early
Totnes	4.47	4.45	2 early
Dainton Sidings	4.54	4.53	1 early
Newton Abbot—arr.	5.1	5.2	2 late*
dep.	5.10	5.12	
Dawlish Warren	5.23½	5.25½	2 late
Exeter St. Davids—arr.	5.36	5.38	Time†
dep.	5.43	5.43	
Cowley Bridge Jcn.	5.46	5.45	1 early
Whiteball Tunnel	6.10	6.5	5 early
Taunton—arr.	6.22	6.22	15 late‡
dep.	6.27	6.42	
Castle Cary	6.56	7.7	11 late
Blatchbridge Jcn.	7.12	7.21	9 late
Clink Road Jcn.	7.14	7.22	8 late
Fairwood Jcn.	7.17	7.24	7 late
Heywood Road Jcn.	7.19	7.25	6 late
Patney	7.33	7.36	3 late
Savernake L.L.	7.44	7.46	2 late
Bedwyn	7.48	7.49	1 late
Newbury	7.59	8.1	2 late
Reading General	8.18	8.17	1 early
Twyford	8.23½	8.22	1½ early
Maidenhead	8.30½	8.27½	3 early
Slough	8.36½	8.32	4½ early
Southall	8.47	8.40	7 early
Paddington arr.	9.0	8.50	10 early

* Signal checks Aller Jcn. and Newton Abbot East and creating vacuum.
†Cautioned—Bradford Crossing gates out of order.
‡ Vacuum defect on vehicle.

Renovation of Two L.T.E. Departmental Locomotives

Two electric departmental locomotives of the London Transport Executive, Nos. L.8 and L.9, built as battery locomotives in 1909 by W. R. Renshaw & Co. Ltd., of Sutton-on-Trent, are being renovated at Acton Works. After their overhaul, they are expected to give a further 15 years' service. The two locomotives were used originally for track maintenance purposes for the Metropolitan District Railway and are among the oldest electric locomotives in the country.

Following the opening of Acton Works, in 1922, as a centralised railway overhaul works, there was an increased need for transshipment of materials to and from Ealing Common Depot. The two battery locomotives were converted at some time before 1925, by removing the batteries and altering the battery compartment to provide an open gondola-type platform, to carry these materials and stores. With the removal of the batteries, the locomotives picked up current from the rails in the normal way.



London Transport departmental locomotive No. L.9, which with a similar unit is being renovated at Acton Works

In 1951, the original G.E.69-type traction motors were replaced by the G.E. 212 type; these were changed again in 1955-56 to the W.T.54 BB type. The original control equipment, however, remained virtually unchanged.

As it is considered that these locomotives still provide the best means of carrying materials between Acton and Ealing Common, it has been decided that the obsolete traction equipment should be replaced by a later type for which spares are available. The original type of equipment fitted to L.8 and L.9 will then be in use only on No. L.10, the Acton Works yard locomotive. Some B.T.H. DB.260 equipment, normally used with WT.54B motors, is available as a result of the scrapping of some District Railway 1910-13 "C," "D," and "E" stock cars, and two of these are to be used in L.8 and L.9.

This work will mean that the vehicles will then be fitted with traction control equipment of a type in general use on the District Line "Q" stock, and also that the wiring of the locomotives will be completely renewed during the renovation.

Parliamentary Notes

Railway Workshops

Major Sir Frank Markham (Buckingham—C.), on the motion for the adjournment in the House of Commons on July 8, called attention to the building, repair, and maintenance programme of British Railways. He said that British Railways, one of the greatest employers in the country, was responsible for the life and death of several towns called into existence by the railways in their days. To put an end to rumours about Wolverton, he had written to Sir Brian Robertson, who had replied that all railway and contractors' workshops were bound to be affected in some degree; but that Wolverton at least was getting its fair share of the available work. The 1959 building programme was still under consideration.

Sir Frank Markham added that the available amount of work was about £90 million worth of orders for locomotives, carriages, and wagons every year. The B.T.C. ought to know what its building programme would be, roughly, for 5-10 years ahead. There should be reasonable priority for the Commission's own workshops, because those workshops were prohibited by law from seeking any outside work. No other form of industry in the country was so restricted as were the railway workshops from the exercise of proper initiative. It was announced on July 4 that 26 new electric trains were to be built at Wolverton. That was a little, but it would not go very far.

In the B.T.C. report for 1957, he went on, there was no word about the British Railways workshops. In all future reports, there should be some reference to those workshops and their programmes.

Mr. Francis Noel-Baker (Swindon—Lab.) said that in Swindon they were perhaps luckier than Wolverton in the sense that although the workshops were created by the G.W.R., only about half the adult population was employed by the Western Region now, while the remainder were in other firms. Since the last debate, redundancy had occurred in several works. At York Carriage & Wagon Works, 210 men; at Doncaster, 78; at Stratford, 73; and at Gorton, 40 men had been declared redundant.

The B.T.C., he continued, was facing major problems. For example, not enough was yet known about the performance of diesel locomotives, and there were several other technical problems relating to modernisation, e.g., heating of coaching stock, which had still to be settled. The men were anxious to know as much as they could be told. When work which they were capable of doing, went outside to private enterprise, at least they should be told the reason for such action.

Mr. Noel-Baker gave four examples:

(1) At Crewe, capstans maintained by the outdoor machinery department, which used to be overhauled at the Crewe works, now were being dealt with outside. The explanation given was that the price charged by the Crewe workshops was £300, whereas private enterprise could do the job for £100.

(2) At Crewe was the only steel foundry belonging to British Railways, but the steel castings being used for the diesel building programme were now being bought from outside. The men found it difficult to understand why private enterprise should be able to do this work more cheaply, because the rate of a railway moulder is 10s. a week lower than the rate paid in private industry.

(3) Again, at Crewe, which had one of the best white-metalling plants in the country, while diesel engines were being repaired there, the metalling of the big

end of the main shaft bearings was being sent out to private contractors.

(4) At the time of the Harrow disaster, in 1952, a prototype set of automatic train control equipment was produced at Derby Works, and 66 sets of this equipment were produced there. In the early part of this year, tenders were invited from private contractors for a further 2,000 of these units, which had been pioneered by Derby Works.

Mr. G. R. H. Nugent, Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation, said that the B.T.C., in placing contracts, had to use its commercial judgment. As these matters arose in the course of day-to-day management, if he or any other Minister tried to deal with them in the House, they would, on the long view, be completely prejudicing any chance the Commission had of efficient management of the railways. They must give it a chance to use its commercial judgment, and not ask it to parade matters which no other commercial concern in the country could possibly do.

The Member for Swindon had accused them of taking an ambivalent attitude towards nationalised industries, because as a party they were against nationalisation, and he questioned whether the railway workshops were being given fair treatment. The Government had been responsible for financing the enormous modernisation scheme, involving some £1,500 million, plus another £250 million to finance the deficit. They had produced the cash, and whatever their reservations about nationalised industries generally, no one could accuse them of not having given the railway industry a chance. But for the finance for the modernisation scheme, "goodness knows what would be the prospect not only for the railways, but for the railway workshops. . . . We are giving these people a reasonable prospect."

Mr. Nugent accepted that any figures of redundancy were serious; but they must remember the general perspective. There were about 126,000 people employed in the railway workshops. From the beginning of 1957, when 126,762 were employed there, until May 18 this year, the diminution was by only about 600 men.

Mr. F. Noel-Baker: Even those figures show that between January and May this year there was a reduction of 2,000, which alarms people in Wiltshire.

Mr. Nugent: The figures have gone up in the meantime. Certainly for the end of 1957 the figure went up to 128,000, and it went down in May to 126,000, but in these very big figures I do not think that the reduction over the long period should give rise to very serious anxiety.

Workshops Policy

The B.T.C. policy, he went on, was laid down in 1956, and three points were mentioned in the debate in May. They were: that the maintenance work should continue to be carried out as far as possible in the railway workshops; that the railway workshops would be used for the construction of new equipment to the extent that they were laid out and equipped for this purpose and so long as they could produce on an economic basis; and that power units for diesel and electric locomotives would generally be purchased from outside industry. At the same time, the Commission had said in regard to private industry that manufacturing organisations were assured that the Commission desired to work with them in close co-operation to achieve the success of the modernisation plan.

Mr. Nugent had had more than one complaint from private industry that in the adjustments of the programme which took place this year, and in the cuts which took place in the early part of this year, it was the private firms which had suffered the greater part of the cuts. They had complained rather strongly that it was they who support the export trade.

"Nevertheless," added Mr. Nugent, "the export trade is not a matter of just picking apples off a tree. It is a very competitive trade, and it is not easy for these industries to compete in that very competitive trade on such a very narrow domestic basis. This is one of the features they have to accept, but naturally they are sensitive to these changes.

Review of Policy

"The Commission pointed out in its 1957 report that the acceleration of the modernisation plan—and contrary to the general impression, the plan has been greatly accelerated over the original intentions—had now obliged the Commission to review the general policy which it laid down in 1956 and had expected to last for five years. It had been obliged to review it before the end of that five years because of the acceleration of that plan. Obviously, the general principles which I have repeated again tonight are likely to remain much the same in the future, but the application may change according to changed conditions as the Commission has to meet them.

"The present position nationally, as the B.T.C. report for 1957 shows, is that in 1957 there was some increase in the building of freight wagons and a small decrease in coaching stock. During the current year, the coaching stock will be a little up on 1957, and the plans are that the 1959 figures, next year, will be roughly in line with the 1958 figures—that is to say, somewhat up on 1957. On the other hand, freight wagon building is being reduced somewhat this year, 1958, and similarly next year, 1959. This is broadly in conformity with the Commission's recently announced cut of some 10,000 in its total fleet of freight wagons. In the overall picture, the total volume of work at Wolverton should be maintained at full capacity both for this year and next."

French Railplane Plans

Mr. L. W. B. Teeling (Brighton Pavilion—C.) stated in the Commons on July 15 that there was in this country a company called International Monorail, which had a branch in London called Railplanes Limited, and another in France called the Société Lyonnaise des Eaux et de L'Eclairage. The French company, closely linked with the London one, had already started an experiment for a monorail at Châteauneuf-sur-Loire, which was to be completed by July, 1959. The French Government had given £100,000 towards the £200,000 required to carry this out.

If it was successful, the company was ready, Mr. Teeling understood, then to work on a monorail to London Airport. They had discussed this on more than one occasion with the Ministry of Transport & Civil Aviation. He gathered it would go from Paddington, would take about 15 min. to get to London Airport, and would cost about £15 million. He presumed that it would take a little time before that was done. The Government had not yet asked this monorail company to give any figures for getting from London Airport to Gatwick.

Questions in Parliament

No Underground Station for Air Terminal

Mr. J. Grimond (Orkney and Shetland—Lib.) asked the Minister of Transport & Civil Aviation on July 8 what proposals he was considering for authorising an underground station at the West London Air Terminal.

Mr. G. R. H. Nugent, Joint Parliamentary Secretary, in a written reply: A new underground station would be costly and could not be entertained before decisions on the various schemes for travel to London Airport.

Staff and Labour Matters

London Busmen's Wage Claim

A settlement was finally reached last week in the dispute in regard to the rates of pay of London busmen. After a seven-hour meeting on July 17 a delegate conference of the busmen decided by 82 votes to 40 with seven abstentions that, as no improvement in the last offer of the London Transport Executive was obtainable, instructions should be given to the union's executive commitee to bring negotiations to an end.

The resolution expressed the delegates' strong condemnation of and protest against the interpretation by London Transport of the agreed terms for a resumption of work. The conference was convinced that the membership would not have called off the strike on the understanding that that was the correct interpretation.

Loss of Confidence

The resolution continued: "We finally wish to record our opinion that the treatment of our wages claim, allied to the now known alarming proposals of the London Transport Executive drastically to reduce services and close garages, make it virtually impossible to have any beneficial form of co-operation with London Transport in the future."

The decision means that the union on behalf of the busmen have accepted under protest the final offer of London Transport to give increases of 5s. a week to drivers and conductors on the country services operated by London Transport and in the garages, which is payable as from July 2, and 7s. 6d. a week to Green Line coach drivers.

Railway Shopmen's Wage Claim

A meeting of the Railway Shopmen's National Council took place today at which the Employees' Side of the council accepted the Commission's offer to improve the rates of pay of railway workshop staff by 3 per cent with effect from June 30, 1958. The offer was subject to the position of railway shopmen's wages being reviewed as may be necessary in the light of future developments, including the proposed review of wages in the railway industry.

In making this settlement, the cost of which would have to be met out of the Commission's own resources, it was emphasised by the Commission that the continued co-operation of the trade unions would be relied on in the execution of the Modernisation Plan and the drive to improve productivity and efficiency in the railway workshops.

The Commission confidently expects that this co-operation will be fully given.

Contracts and Tenders

Main-line diesels for British Railways and electric coaches and equipment for Victoria

The British Transport Commission has placed orders for 124 main-line diesel-electric locomotives for mixed traffic duties. They will be designated Type "2," the classification for locomotives in the 1,000-1,250 h.p. range.

Forty of the locomotives have been ordered from Brush Traction Limited of Loughborough, which company will build the units complete. They will be of 1,250 h.p. and be similar to locomotives being delivered to the Eastern Region.

The remaining 84 are to be erected in British Railways' workshops. These will incorporate power equipment to be supplied by the British Thomson-Houston Co. Ltd., Rugby. This will be very similar to the 30 1,160-h.p. Sulzer/B.T.H. equipment already being delivered to British Railways.

Deliveries of the locomotives and traction equipment will begin early in 1959. 106 of the 124 locomotives will be allocated to the Eastern Region; the remainder will work on the North Eastern Region.

Victorian Government Railways has placed a repeat order for 90 motor coaches and 120 trailer coach electric traction equipment sets valued at over £1 million, with the English Electric Co. (Australia) Ltd. In 1956, V.R. started a service with 90 motor coaches and 120 trailer coaches to form multiple-unit electric trains for its Melbourne suburban lines. All the electrical equipment for this modernisation programme, designed to give a maximum speed of 80 m.p.h., was manufactured by the company.

The motor coaches, which are over 60 ft. long and seat 59 passengers, are designed to operate in multiple-unit in a variety of formations. The trains operate on a 1,500-V. d.c. overhead system.

British Railways, London Midland Region, has placed the following contracts:—

Kyle Stewart (Contractors) Limited, London, N.W.6: renewal of roof covering and vertical screen at Manchester Exchange Station

Leonard Fairclough, Limited, Adlington, Lancs: District Electric Depot at Longsight, Manchester

G. & J. Seddon Limited, Little Hulton, Nr. Bolton: new roof coverings and general repairs at Mayfield Station, Manchester

Robert Watson & Company (Constructional Engineers): supply and erection of steelwork at Road Motor Depot, Huskisson Goods Station, Liverpool

S. & C. Walmsley Limited, Liverpool, 10: structural steelwork at Diesel Maintenance Shed, Etches Park, Derby

Stephenson Developments (Huddersfield) Limited, Linthwaite, Huddersfield: accommodation for Staff Association, Lancaster (Green Ayr)

Butterley Co. Ltd., Butterley, Derby: supply fabrication and delivery of girderwork for bridge No. 72 on Water Orton-Wolverhampton line

John Booth & Sons (Bolton) Ltd., Bolton: supply, fabrication and delivery of girderwork for bridges on London-Bedford line, bridge at Fazackerley North Junction, Langton & Alexandra Docks, Liverpool, bridge No. 379 on Marylebone-Manchester (former G.C.) line and bridge No. 122 on Winnington branch

Kingston (Architectural Craftsmen), Hull: supply and erection of laminated timber frames to sheds and workshops, New Electric Depot, Longsight, Manchester

E. Wood & Sons Ltd., Derby: improved toilet and washing facilities at Motive Power Depot, Crewe South

E. E. Jeavons & Co. Ltd., Tipton, Staffs: surfacing of roadways, Camp Hill Goods Depot, Birmingham.

The North Eastern Region of British Railways has recently placed the following contracts:—

General Electric Co. Ltd., Coventry: Electrification of East Coast main line; provision of two 1 + 12 channel open wire carrier telephone systems

Broom & Wade Limited, High Wycombe: Darlington Faverdale Works, Carriage & Wagon Engineering Development Unit; air compressor

Clough Smith & Co. Ltd., Crawley: Tyne Dock, Green Lane Signalbox, laying m.v. cable

R. Rutherford & Sons Ltd., Newcastle: Longbenton; station improvements

Modern Paviors Limited, Shipley: Bradford, Arkwright Street; reconstruction of carriageway and footpath.

The Special Register Information Service, Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From Korea:

(a) 4,200 each, railroad track bolts, rolled threads, heat treated, carbon steel, complete with carbon steel square nuts; $\frac{7}{8}$ in. dia. × $4\frac{1}{2}$ in. long with oval neck and round head

4,200 each, spring washers for use with $\frac{7}{8}$-in. rolled thread track bolts

2,100 each, rail angle bar, open hearth, punched, heat treated, carbon steel for 75 lb. per yd. A.S.C.E. rail section

20,300 each, tie plates, railroad, hot worked, high carbon steel

(b) Reinforced steel bars, coiled twisted deformed, structural billet-steel: Diameter: $\frac{3}{8}$ in. dia., 200 tonnes, approx.; $\frac{1}{2}$ in. dia., 200 tonnes, approx.; $\frac{5}{8}$ in. dia., 50 tonnes, approx.; $\frac{3}{4}$ in. dia., 50 tonnes, approx.

The issuing authority and address to which bids should be sent is the Office of Supply, Government of the Republic of Korea, Seoul, Korea. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The tender Nos. are *(a)* 89-33-453-6-70394.1, and *(b)* 89-12-211-9-70348. The closing date is August 8, 1958. The Board of Trade reference is ESB/17719/58/I.C.A.

From Thailand:

Points and crossings as follow:—

Simple turnouts, 1 in 10: 215 sets l.h., 232 sets r.h.

Simple turnouts, 1 in 8: 4 sets l.h., 5 sets r.h.

Double slips, 1 in 10: 5 sets

Double slips, 1 in 8: 3 sets

Fixed crossings: 2 sets.

The issuing authority is the State Railway of Thailand. The tender No. is B.E. 2501 (1958). Bids should be sent to the Superintendent of Stores, State Railway of Thailand, Bangkok. The closing date is September 19, 1958. A deposit of Bht. 100,000 in cash or band endorsed cheque or bank's letter of guarantee only (other forms not accepted) has to be made at the Railway Cashier Office, and receipt of which must be produced when submitting the tender. The Board of Trade reference is ESB/17867/58

From South Africa:

200 pr. wheels and axles, each pair comprising two wheels fast on axle, to suit 24-in. gauge, with an axle dia. of 2 in., the axle having a tensile strength of 35/40 tons.

The issuing authority is the Union Tender and Supplies Board. The tender No. is F.T.397. Bids should be sent to the Chairman, Union Tender and Supplies Board, Assize Buildings, 291, Bosman Street, Pretoria. The closing date is August 7, 1958. Local representation is essential. The Board of Trade reference is ESB/18606/58.

Further details regarding the above tenders, together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1.).

The Special Register Information Service, Export Services Branch, Board of Trade, circular TEN/32778 dated June 5, 1958, gave information concerning diesel railcars for Thailand. The Branch has now been advised that the maximum gradient and length of maximum gradient, shown as 15 per cent and 1,000 m., should read 15 per mille and 1,000 metres. The Board of Trade reference is ESB/14345/58.

The Special Register Information Service, Export Services Branch, Board of Trade, has been advised that the East Bengal Railways is proposing to improve its signalling system, by putting in new signalling equipment in the following three sections:—Dacca-Akhaura; Bhairab Bazar-Narayanganj; and probably the Mymensingh or Sylhet section.

The Railway Division of the Ministry of Communications at Karachi has approved the scheme in principle, at least so far as the first section is concerned, and has called for yard plans of the stations in the sections with the Eastern Bengal Railway new signalling proposals shown on them. It is hoped that tenders will be issued for the first section during this financial year, that is before March 31, 1959, and that work will commence during the next financial year.

The contract will embrace the (*i*) supply of the equipment; (*ii*) its erection; and (*iii*) its operation during a period of one year. East Bengal staff will be associated with the contractors during the second and third phases of the contract and will thus obtain practical training in erection and use of the new equipment.

No further information about this call for tenders is at present available in the Branch. It is hoped, however, to obtain a copy of the tender documents, which if received, will be available for loan to United Kingdom firms in order of receipt of applications. The Board of Trade reference is ESB/18073/58.

Notes and News

Reduced Dividend for Motor Rail Limited.—Motor Rail Limited is reducing its dividend from 8 per cent to 7 per cent for the year ended March 20, 1958. Consolidated net profit fell from £35,626 to £17,908, after tax of £25,840 (£38,350). After transferring £8,297 (£25,000) to reserve, £8,096 (£7,873) is carried forward.

British Institute of Management National Conference.—Reference was made on page 60 of our July 11 issue to the opening on November 26 of the British Institute of Management National Conference at Brighton by Mr. Peter Thorneycroft, M.P. We are now informed that Mr. Thorneycroft will be unable to participate in the opening ceremony, as he will be absent from Britain at that date.

Metropolitan Line Electrification.—Work has begun on electrification of the 10-mile section of the Metropolitan Line of London Transport from Rickmansworth to Amersham and Chesham. It is due for completion in the summer of 1960. When electrification is completed, Amersham will become the terminus of Metropolitan Line trains, instead of Aylesbury. Trains serving stations between Amersham and Aylesbury will run from and to Marylebone, in the London Midland Region of British Railways.

Boat Train Hits Buffers at Ardrossan.—About 65 passengers were reported to have been injured when an Irish boat train from Glasgow ran into the buffers at Montgomerie Pier Station, Ardrossan, Scottish Region, on July 17. About 60 were treated for slight injuries either in the station or on board the motorship *Irish Coast*, which was tied up to the pier. Five of the injured were taken to hospital. The sailing to Belfast was delayed while doctors attended the casualties, most of which are believed to have been caused by falling luggage.

English Electric Diesel Locomotives for Ghana.—The accompanying illustration shows the Ghanaian Minister of Communications, Mr. P. K. K. Quaidoo, signing the contract for 12 750-h.p. Bo-Bo diesel electric locomotives for the Ghana Railway & Harbours Administration for which an order was placed with the English Electric Co. Ltd., as recorded in our June 27 issue. The locomotives will be built by Robert Stephenson & Hawthorns Limited, a member of the English Electric Group. Left to right are: Mr. R. O. Amuaku-Attah, Parliamentary Secretary, Ministry of Communications; the Minister of Communications; Mr. J. Edwards, representative of the English Electric Co. Ltd., and Mr. H. G. McFall, of Bartholomew (London) Limited, agents of the English Electric Co. Ltd.

Wagon Repairs Second Interim Dividend Declared.—A second interim dividend of 10 per cent is declared by Wagon Repairs Limited to be confirmed as a final for the year ended March 31, 1958, on capital increased by a one-for-four scrip issue. This makes the equivalent of 18 per cent for the year, representing an effective increase of 2 per cent.

Brush Type "2" Diesel Deliveries Ahead of Schedule.—Brush Traction Limited, which is building 20 Type "2" 1,250-h.p. diesel-electric locomotives for the Eastern Region of British Railways, has announced that its deliveries of these locomotives are "ahead of schedule." The next locomotive to be handed over by Brush Traction, the fifteenth, will be nine weeks earlier than scheduled.

Accident to Belgian Electric Train near Brussels.—Five persons were killed and 20 injured, five of them seriously, when the two rear coaches of an electric train from Antwerp to Brussel left the rails on July 18 at Vilvorde Station near Brussels, the Belgian National Railways have announced. An official statement said all those killed and injured had been in the last coach but one, which overturned. It is reported that the coach was shattered and wreckage and twisted rails were flung over a wide area. M. Paul Segers, Belgian Minister of Communications, and railway officials carried out an investigation on the spot into the accident, believed to have been caused by rails buckling in the hot sun. The Chairman of the British Transport Commission, Sir Brian Robertson, has sent a message of sympathy on behalf of the Commission to the President of the Belgian National Railways, Monsieur Gaston Claeys.

L.M.R. Stations to be Closed.—The following London Midland Region stations are to be closed on August 5: Wavertree (L. & N.W.), between Garston and Edge Hill; Barton & Walton, between Tamworth and Burton; and Spring Vale, between Bolton and Blackburn. The areas are served by buses, and arrangements are being made to deal with parcels and passenger train merchandise. The present arrangements for goods traffic at Barton & Walton and at Spring Vale will continue. Wilbraham Road goods depot, between Manchester Central and Guide Bridge, is to be closed on August 4. Alternative arrangements are being made for merchandise, minerals, and coal class traffic.

Rhewl Goods Depot to Close.—British Railways, London Midland Region, announces that the goods depot at Rhewl, between Corwen and Denbigh, will be closed from September 1. Freight, livestock, and coal class traffic, also parcels and passenger train merchandise, will be dealt with at Ruthin Station.

Charles Churchill & Co. Ltd. Results.—The results of Charles Churchill & Co. Ltd. for the year ended March 31 have allowed a final ordinary dividend of 10½ per cent, less tax, making 18 per cent, less tax, for the year. The consolidated profit for the year after tax is £437,737, as against £485,344 last year. Revenue reserves now amount to £1,989,098 and current assets exceed current liabilities and provisions for future taxation by £2,516,714 which represents an increase of £5,870 over the corresponding figure last year.

Weir-Catton Limited.—The boards of G. & J. Weir Limited and Catton & Co. Ltd. have decided to combine their foundry activities by forming a new company, Weir-Catton Limited, to acquire the capital of Catton & Co. Ltd. and the capital of the Argus Foundry Limited, a wholly-owned subsidiary of G. & J. Weir, Limited. This, it is felt, should result in a strong, broadly based business supplying steel, iron, and non-ferrous castings; and at the same time enable production facilities to be used to advantage by pooling of sales, technical, and other resources. The share capital of Weir-Catton Limited will be owned as to 50 per cent by G. & J. Weir Limited, and as to 50 per cent by the existing shareholders of Catton & Co. Ltd. It is honed that the new company will be formed before September 30. The name of the Argus Foundry Limited will be changed to Weir Foundries, Limited.

New Ship for Eastern Region Continental Freight Services.—Mrs. Johnson, wife of Mr. H. C. Johnson, General Manager of British Railways Eastern Region, on July 18 launched the mv. *Isle of Ely* at the yard of the Goole Shipbuilding & Repairing Co. Ltd., Goole, Yorks. This vessel is the first of two sister ships ordered from this firm by the Eastern Region for freight services between Harwich and Rotterdam and Harwich and Antwerp. The vessels have been designed to carry a full load of rail freight containers, or general cargo or, alternatively, part loads of each. The vessel is 226 ft. long; the holds and 'tween decks can accommodate 42 of the largest "B" class railway containers. As there is ample shore crane facilities at terminal ports, no cargo handling gear is arranged on the ship. The size of hatches is such that all containers can be stowed on board either by lowering direct on to the deck or tank top or by "drifting" under the hatch coaming whilst still suspended from crane hook. Maximum deadweight capacity on the mean load draft of 13 ft. 2 in. is approximately 900 tons. The main engine is a Ruston & Hornsby Limited type 8VOXM, delivering 1,806 s.h.p. through a wheel

Signing the contract for 12 English Electric 750-h.p. diesel locomotives for Ghana Railways

drive 2:1 with an oil-operated reverse/reduction gearbox. Speaking after the launch, Mr. J. B. Peile, Member of the Eastern Area Board of the B.T.C., said that the building of the two ships showed that the Eastern Region had confidence in the Anglo-European shipping business, which was a highly competitive business. More and more interest was being taken in the container system which made it possible to give door-to-door delivery through Harwich to a large part of Europe. He even believed that they could capture new trade bearing in mind the growing community of interest between the nations of Western Europe.

Railway Benevolent Institution.—At a meeting on July 21 the Board of the Railway Benevolent Institution granted annuities to seven widows and 11 members involving an additional liability of £406 a year; 98 gratuities were also granted amounting to £920 to meet cases of immediate necessity. Grants made from the Casualty Fund during the month of June amounted to £1,075.

George Cohen 600 Group Results.—The combined profits of the George Cohen 600 Group Limited for the year ended March 31, amounted to £1,813,815; this compares with £2,336,628 for the previous year. Group profits after taxation were £817,177 (£1,097,686). The proposed final dividend on the ordinary stock is 7½ per cent (8½ per cent), the interim dividend being 4½ per cent (3½ per cent).

Kitchen & Wade Limited Fuller Order Book.—Kitchen & Wade Limited reports that the order book is now better than at the end of March, which closed the last financial year. It is also added in the chairman's statement what may be interpreted as a view that dividend possibilities are better than ever before, it is reported. On the past year's slightly reduced profits the payment is rather more than 2½ times covered. The company is making a one-for-two free scrip issue for which there are more than ample reserves available.

Increased Sales for Renold Chains Limited.—Total sales of Renold Chains Limited were higher for the year ended March 31 than in the previous year despite a setback in the export market. The order book was maintained at a satisfactory level in relation to the short-term ordering policy generally adopted by home and oversea buyers. Expansion plans of the Group are proceeding according to programme. Capital commitments were shown at £758,000 (£786,000) and that for the subsidiaries at £81,000 (£173,000). The board is raising a further £2 million by way of a "rights" issue of ordinary shares and is hoping to maintain the dividends on the increased capital at the same rates as paid for 1957-58; namely, an interim of 3 per cent and a final of 9½ per cent.

Meritorious First Aid Awards to Railwaymen.—Police Constable Ronald Brooke of Wyre Dock, Fleetwood, of the B.T.C. Police, and Oiler George Radcliffe of Garston, today, at Euston, are to receive from Mr. David Blee, General Manager of British Railways, London Midland Region, meritorious awards and certificates for rendering exceptional first aid to the injured. Oiler Radcliffe, who is aged 67, lowered himself by a rope tied to a van to rescue and render first aid to a man who had fallen 28 feet over the quay wall to the bed of the River Mersey. In a wind of gale force, he treated his patient for injuries to the spine and severe shock; the injured man was then hauled up to the quay on a stretcher which had been lowered. P.C. Brooke was called by a signalman to a man wandering on the main line who had been injured through a fall from a motor cycle. He treated his patient for severe injuries to the scalp, shoulder, wrist, face and ribs so efficiently that the dressings were left intact by the doctor when the man was received at Fleetwood Hospital.

B. & S. Massey Limited Conserves Resources.—Mr. K. F. Massey, Chairman of B. & S. Massey Limited, states, in his annual report that in view of the difficulty in foreseeing the trend of trade in the immediate future, the directors are impressed with the need to conserve resources, particularly in such a business which requires substantial capital to maintain and improve manufacturing equipment. The works of the forging plant have been occupied fully, and to meet delivery requirements considerable resort has had to be made to sub-contracting and overtime. The intake of orders during the year has been steady, but has not kept pace with output, and inroads have been made into the order-book—not entirely disadvantageous, providing the process does not continue too long.

A.C. Electrification in China.—The Chinese Ministry of Railways is drawing up a 15-year plan for the electrification of certain main lines. Three mountain sections will be first electrified to ease traffic bottlenecks. These will be the Paochi-Fenghsien section of the Paochi-Chengtu, the Fengtai-Shacheng section of the Peking-Suiyuan, and the Tatung-Taiyuan section of the Tatung-Puchow Railways. At a later stage it is expected that these railways will be wholly electrified. All main-line electrification is to be carried out on the 25,000-V. a.c. 50-cycle system. The Siangtan power equipment plant, in Hunan, has built its first electric locomotive. This is a standard-gauge, 80-ton, 880 kV. industrial and mining locomotive, which can haul trains of 1,300 tons on the level at speeds up to 45 m.p.h. Twenty-nine more locomotives are being built; they will be used in the Wuhan and Paotow districts.

Heavy Load via Harwich/Zeebrugge Ferry.—The accompanying illustration shows a 113-ton anvil, part of a 415-ton drop hammer, exported from Birmingham to Vénissieux, near Lyons, via the Harwich/Zeebrugge train ferry. Because of its weight, the anvil was loaded on a Flatrol EAA wagon, with cantilever equipment to spread the load. The consignment is the heaviest piece of machinery ever carried by the train ferry. The special train is seen approaching Shenfield, Eastern Region, en route to Harwich.

Trains delayed by Gas Works Fire.—Trains to and from Portsmouth were halted for some hours after a fire broke out on Monday at Portsmouth Gas Works, which adjoin the electrified line of the Southern Region: hoses had to be laid across the track. The Waterloo-Portsmouth electric services were terminated at Havant, and the diesel services to and from Fareham and beyond, at Cosham.

Locomotive Named "Territorial Army" to Celebrate T.A. Jubilee.—At Euston, last Wednesday, the Duke of Norfolk named British Railways, London Midland Region, locomotive No. 70048, *Territorial Army*, to commemorate the T.A. jubilee. Mr. David Blee, General Manager of the Region, presided. Before unveiling the plaque, the Duke inspected a detachment of the T.A. Accompanying him were Major-General W. R. Cox, Director of the Territorial Army, and the Chairmen of the City of London T. & A. F. As. In the course of his remarks Mr. David Blee emphasised that with increasing diesel haulage the name *Territorial Army* would be transferred to a diesel-electric locomotive; meanwhile, steam locomotive 70048 would bear the illustrious title with credit.

British Standard for Keys and Keyways.—Requests for larger manufacturing tolerances have resulted in this revised edition of B.S. 46 : Part 1. The various types of keys and keyways now have, as far as possible, consistent dimensions and tolerances, so enabling a standard range of cutters to be used for machining the various types of keyway. It is pointed out, however, that the increased tolerances recomemnded may inevitably entail more fitting of keys into keyways than was envisaged in the 1953 edition. The tolerances on the width and depth of rectangular and square plain and gib-head keys have been increased; and keys of $\frac{1}{32}$-in. size have been eliminated. Also in response to requests by industry, details of tangential keys have again been included. The 33-page illustrated publication concludes with an appendix listing the approximate metric equivalents of metric

Flatrol EAA wagon with cantilever equipment conveying 113-ton anvil to Harwich en route to France via Harwich/Zeebrugge train ferry

and inch units. Copies of this Standard (B.S. 46 : Part 1 : 1958) may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1. The price is 7s. 6d.

Reduced Order Book for Ruston & Hornsby Limited.—Capital expenditure during the year ended March 31, 1958, was kept to a minimum, according to Mr. W. Ruston, Chairman of Ruston & Hornsby Limited, and the policy will be continued while trading conditions remain uncertain. The unexecuted order book at the end of the financial year was 14 per cent less in value than at March 31, 1957. During more recent months the rate of orders has improved but the pattern is unbalanced, resulting in certain sections of the factories working well below capacity. Any increase in wages will have to be passed on to the customer and probably result in a further fall in the order book. Until some of the difficulties are overcome, the prospects for the immediate future is "uncertain." The financial results were given on page 30 of our July 4 issue.

Keith Blackman Limited Financial Report.—Although the amount of business done by Keith Blackman Limited during the year ended March 31 exceeded that of the previous year, resulting in a higher profit, conditions proved no less onerous than during last year, principally because of the continued increase in costs of both wages and the basic materials and services. The company continued to aim constantly at operational economy and to improvements in design and manufacturing methods in an endeavour to offset these difficulties as far as possible in order to hold prices and expand sales. The profits of the group, after depreciation and so on, and before taxation, shows an increase of £82,764 as compared with the previous year. £75,000 has been allocated to general reserve account. The ordinary dividend is increased to 17½ per cent, less income tax, which absorbs £60,375. Fixed assets stand at £403,370 (£406,770), slightly below that of the previous year.

Reduced Value of Orders for Edgar Allen.—Towards the close of the year to March 29 there was a very definite slackening in demand in some sections for Edgar Allen & Co. Ltd., it has been announced As a result the volume and value of orders on hand have been reduced, although not too seriously so far, and, they add, this may well affect the current year's trading unless demand improves. In 1957-58 the value of group sales was a record and some 6 per cent higher than previously. The parent company contributed about 70 per cent of the total. Group net profits expanded from £257,150 to £375,746 and the dividend remains at 12½ per cent. Fixed assets are higher at £1,994,285 (£1,874,842) and net current assets amount to £2,333,336 (£2,215,382). Outstanding commitments amount to £116,465 (£99,524).

British Oxygen Interim Dividend.—The British Oxygen Co. Ltd. is again paying an interim dividend of 4 per cent on its £17 million ordinary capital. Although the directors state that the results for the first half of the current year are satisfactory and encouraging, they feel it prudent, in view of all the circumstances, national and international, to reserve for further consideration the question of an increase in dividend until the end of the year. Last year's total dividend was again brought up to 10 per cent, with an unchanged final payment of 6 per cent.

Forthcoming Meetings

July 26 (*Sat.*).—Permanent Way Institution, Manchester & Liverpool Section, in the Ambulance Rooms, Nantwich Road, Crewe, at 2.30 p.m. Talk on "The Manchester-Crewe Modernisation," by Mr. T. Mylroi.

August 20 (*Wed.*) to August 30 (*Sat.*).—Model Engineer Exhibition at the New Horticultural Hall, Westminster, S.W.1.

Railway Stock Market

The heavy fall in stock markets, which was most marked in oil shares and British Funds, was followed by a partial rally in the hope that the serious events in the Middle East may be localised. The easier trend of sterling in relation to the dollar was mainly responsible for sharp declines in gilt-edged stocks, because of fears that an early reduction in the bank rate now seems unlikely. In fact, the view appears to be gaining ground that if the £ were not to develop renewed strength by the autumn, the bank rate might have to be raised above its present 5 per cent. It is clear that for the present events in international affairs must continue to govern stock markets and that for the time being, buyers are likely to show considerable caution. Selling has not been as heavy as might have been expected, apart from oil shares. Meanwhile, financial results coming to hand have again emphasised that in many industries, profit margins have narrowed both at home and abroad, the result mainly of increased competition.

Where changed, foreign rails moved back with the general trend in markets. Antofagasta ordinary stock, for example, was 14½, compared with 15 a week ago, and the preference stock declined from 29½ to 27½; the 5 per cent (Bolivia) debentures marked 94¼.

Chilean Northern first debentures were dealt in at 38 and Costa Rica ordinary stock at 16. Paraguay Central 6 per cent debentures transferred at 12½.

Mexican Central "A" bearer debentures eased a point at 70. United of Havana second income stock was 7, and San Paulo Railway 3s. units were again quoted at 2s. Brazil Railway bonds marked 5⅝.

Nyasaland Railways shares were 11s. 6d. and the 3½ per cent debentures were dealt in at 67. West of India Portuguese capital stock has transferred at 78. Midland of Western Australia stock marked 5½.

Canadian Pacifics rallied after an earlier decline and at $50 were unchanged as compared with a week ago: the 4 per cent preference stock was 52½ and the 4 per cent debentures were 65⅛. White Pass shares eased from $13 to $12⅞.

There was little business reported among shares of locomotive builders and engineers. Beyer Peacock 5s. shares eased to 8s. compared with 8s. 3d. a week ago, while Charles Roberts 5s. shares were also 8s. Wagon Repairs 5s. shares were 10s. 9d.x.d. and Gloucester Wagon 10s. shares at 14s. 4½d. were virtually the same as a week ago. G. D. Peters have changed hands at 21s. 6d. and Birmingham Wagon came back from 15s. 7½d. a week ago to 15s. 1½d., while North British Locomotive at 11s. 3d. remained at the lower level which followed the chairman's annual statement.

General Electric at 32s. were within 9d. of the price ruling a week ago, despite the decline in profits. The reduction in the dividend to 10 per cent, compared with the previous year's 12½ per cent, was not unexpected in view of the warning given by the half-yearly figures. Sales rose last year by 6 per cent to £104,000,000, but net trading profits were 23 per cent lower at £4,765,000, compared with £6,168,000. Crompton Parkinson 5s. shares at 10s. 1½d. were within 3d. of a week ago, Associated Electrical at 49s. 9d. compared with 50s. and English Electric at 53s. 3d. were also little changed on balance. Platt Bros. shares were 30s. and J. Stone 52s. following terms of the proposed merger which will result in one of the biggest engineering and kindred groups with net tangible assets of over £22,000,000.

Westinghouse Brake shares at 38s. were within 6d. of the price a week ago. Metal Industries at 33s. 3d. lost a small part of their recent big rise, Ruston & Hornsby were 23s. 3d.x.d., but British Oxygen at 35s. 6d. moved a few pence higher on balance, and moreover Vickers with an advance to 31s. 6d. also moved against the general trend of markets. Elsewhere, Ferrybridge Industries 4s. shares were steady at 14s. 1½d. and Vokes 4s. shares 15s. T. W. Ward have held their rise to 79s. Pressed Steel 5s. shares were 14s. 10½d. compared with 15s. 7½d. a week ago. Dowty Group 10s. shares eased from 32s. to 31s. 6d. with the prevailing trend this week.

OFFICIAL NOTICES

SENIOR DETAIL DRAUGHTSMAN. East Midlands firm of railway, switch and crossing manufacturers urgently require a Senior Detail Draughtsman. Applications are invited from reliable men with experience in detailing permanent way layouts. High salary will be paid to the right man and house purchase assistance will be available if necessary. Applicants will be required to attend interview, when out-of-pocket expenses will be refunded. Conditions include pension scheme, annual bonus and canteen.—Reply giving details of age, experience, qualifications and salary required to: The Chief Draughtsman, The Railway & General Engineering Co. Ltd., Midland Works, Meadow Lane, Nottingham.

CONTRACTS MANAGER required for Railway and Civil Engineering Firm. Applicants must be qualified Civil Engineers experienced in Railway Design and Construction, well versed in Contract procedure and capable of meeting and dealing with the Project Engineers of the Nationalised Industries and with Consultants. The position is an executive one and involves controlling Contracts and Site Personnel in various parts of the country. Initiative and drive are essential, and the appointment offers excellent scope, good salary and incentive bonus to the successful applicant. Applications which will be treated in the strictest confidence should state—Age, qualifications, experience in detail, and indication of salary required.—Write: General Manager, Eagre Construction Co. Limited, East Common Lane, Scunthorpe. *Telephone No.:* Scunthorpe 4513.

EAST African Railways and Harbours Administration. TELEGRAPH ASSISTANT. To be responsible to the Signal and Telegraph Engineer for the installation and maintenance of all signalling and telegraph apparatus. Pensionable appointment in salary range £1,170 to £1,755 p.a. Free passages for officer, wife and family; free furnished quarters if available. Free medical, but not dental, attention. Generous leave. Candidates, between 25 and 35, must be A.M.I.R.S.E. and have thorough experience of telecommunication systems associated with railways, and in particular single and double line blocks, traffic control telephone, and telegraph systems, and be capable of designing, estimating and controlling the maintenance organisation associated with such installations. Knowledge of mechanical and power signalling systems and radio systems an advantage.—Write, Director of Recruitment, Colonial Office, London, S.W.1, stating briefly age, qualifications and experience, quoting BCD 173/053.

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